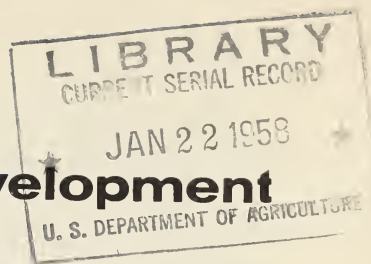


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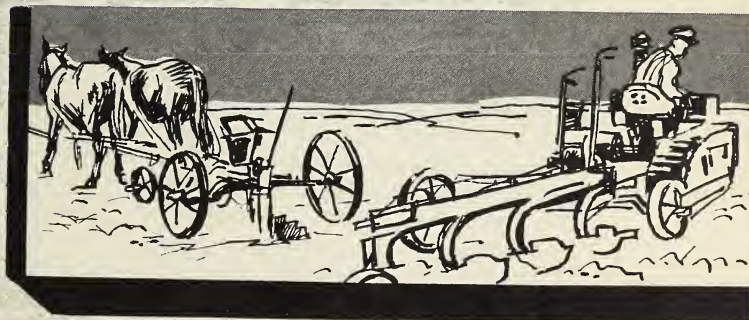


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# **Agricultural Development** **in *TURKEY***

*Effect on Products Competitive With U.S. Farm Exports*



Foreign Agriculture Report No. 106

FOREIGN AGRICULTURAL SERVICE

U. S. DEPARTMENT OF AGRICULTURE

JANUARY 1958

## Foreword

This study of agricultural development in Turkey is a part of an investigation of the competitive aspects of large-scale agricultural development programs in the Middle East. For the study in Turkey it was requested that special emphasis be given to the grain and cotton situation.

The author spent most of the month of April 1957 in Turkey. He visited the Provinces of Istanbul, Ismir, Manisa, Aydin, Sahair, Icel, Ankara, Konya, Afyon, and Eskisehir. He consulted many officials of the Turkish Government, as well as private agencies and individuals. He also conferred with officials of the United States Embassy and the International Cooperation Administration in Turkey, as well as others in Washington who had worked in Turkey. The field study was conducted through the United States agricultural attache's office. The author sincerely appreciates the assistance received from the many people contacted throughout the study.



Assistant Administrator  
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## AGRICULTURAL DEVELOPMENT IN TURKEY

### Effect on Products Competitive with U. S. Farm Exports

By Quentin M. West, Assistant Chief,  
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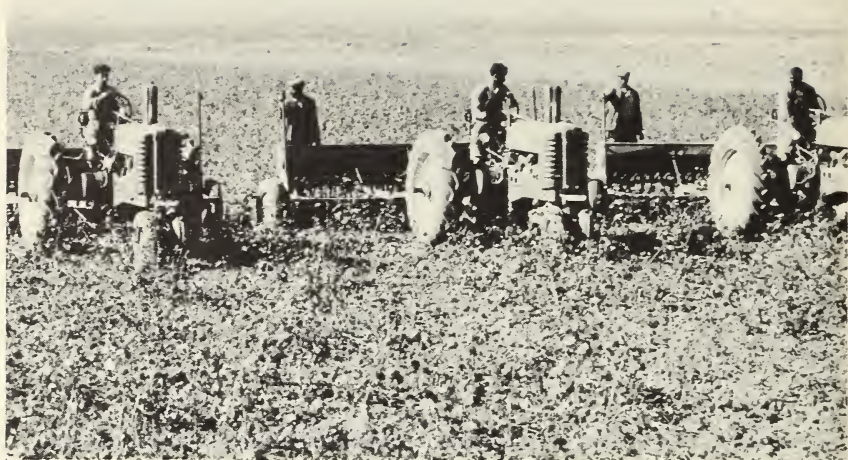
Turkey has made tremendous progress in its agricultural development, with production almost double the prewar level. However, this advance has not been made without difficulties, and Turkey is presently in a tight economic situation. Investment continues in industrial and agricultural expansion; however, many of these projects have not as yet produced the economic return anticipated. Increased agricultural exports were to provide the foreign exchange for required imports, but unfavorable weather and increased domestic consumption have caused exports to fall far short of projected levels. The Government is making a determined effort to overcome these financial difficulties so that Turkey may reap the benefits of its economic development program, the heart of which is agricultural improvement.

Turkey embarked on its expanded program of agricultural development soon after World War II. Its objectives were to increase agricultural exports, raise farm prices, and improve rural conditions. The project to receive greatest emphasis was the expansion of grain production, especially wheat, in the Central Plateau. A vast mechanization scheme was initiated, and nearly 40,000 tractors and supporting equipment were imported between 1949 and 1953. Grain support prices were increased and grain marketing facilities were improved. Credit for land improvement, machinery purchase, and crop production was greatly increased.

Cotton expansion was also encouraged. This was largely because of high world prices during the Korean War, but also because of growth of the domestic textile industry and of mechanization, some irrigation and drainage development, control of malaria on the Cukrova Delta, and improvement of marketing organizations.

As a result of this huge development program, almost 15 million acres of additional land were brought under cultivation. Between 1947 and 1953 the area in wheat increased 53 percent, barley 35 percent, and cotton 194 percent. This increased acreage, coupled with better-than-normal weather, resulted in a rapid expansion of production, which reached





Tractors and other modern farm equipment have been important in Turkey's agricultural development of the past decade. Left, farmers of Turkey's Anatolian Plateau are proud of the up-to-date machinery their small village has for improvement of agricultural production. (Top photo courtesy ICA.)

a peak in 1953. In this year the agricultural production index was 190 compared to prewar.

Exports grew with production, and grain and cotton became important foreign exchange earners, exceeding tobacco from 1950 to 1953. From the 1953 grain crop, almost a million metric tons of wheat and 160,000 tons of barley were exported--36 million and 7 million bushels, respectively. Cotton exports reached a high point of 94,000 metric tons--432,000 bales--from the 1952 crop. In these high years, Turkey was the sixth largest exporter of wheat and cotton in the world.

Since 1953, less-favorable weather has cut grain production sharply; and reduced world prices and increased production costs have caused cotton production to level off. In the short span of 1 year, Turkey shifted from a big exporter of grain to a sizable importer, and has imported grain every year since 1954, mostly from the United States. Cotton exports fell off too. With expanded domestic utilization, they had dropped 65 percent by 1956.

Turkey had planned to finance its huge economic development program through increased agricultural production and exports--especially of wheat and cotton. These exports were to earn increasing amounts of foreign exchange each and every year between 1953 and 1959. Total value of agricultural exports was projected to reach more than \$536 million by 1959 compared to \$321 million in 1953. However, the Government did not fully consider the highly variable nature of production on the semiarid Central Plateau, where drought can be expected at least 1 year in 5. Export projections were based on the level of production in a year with highly favorable weather, which can only be expected with about the same frequency.

In addition, some segments of Turkey's agricultural economy, including its traditional foreign exchange earners--tobacco, dried fruits, and nuts--received only incidental attention in this huge development. Furthermore, production was seriously reduced with the plowing up of a fourth of the pasture land. For generations, livestock had been the source of the Anatolian farmer's cash income, and as late as 1948 was next to tobacco and dried fruits and nuts in foreign exchange earnings.

Thus, during the past 3 years Turkey has found itself in a difficult economic position. Investment has continued in industry, transportation, public works, electric power projects, and agricultural industries--especially grain storage, food processing, and textiles mills--all of which require a high level of imports. At the same time, a reduction in exports has created a serious unfavorable balance of trade--\$8,185 million in 1955. Turkey's foreign debt has reached \$400 million. The Turkish lire has been maintained at the official level of 2.80 to United States \$1 but on the free market it has fallen to one-third or one-fourth of that value.

The high level of investment has increased money incomes, especially in the urban sector. This increase, along with a liberal credit policy, has created an excessive pressure of demand. This has been aggravated by agricultural production and industrial output failing to reach anticipated levels, making a shortage of consumer goods. Thus, wholesale prices have risen--from an index of 107 in 1953 (1948 = 100) to 159 at the end of 1956.

To help meet this situation the Government has taken measures to encourage agricultural production and export. Support prices are maintained for grains, cotton, tobacco, raisins, figs, filberts, and sugar beets. Export subsidies

are allowed on almost all exports except tobacco, nuts, mohair, and figs to certain countries.

In addition, the Government has discouraged imports by imposing a 40 percent import tax. Also, measures to control bank credit were instituted. Retail prices were placed under government regulation. A ministerial committee has been empowered to allocate investment funds so as to supervise more closely the utilization of scarce resources.

In spite of these measures, Turkey will still face serious economic problems in the immediate future. Wheat and cotton will not produce the anticipated foreign exchange, and Turkey must look elsewhere for income to finance its economic development programs.

It is estimated that area in wheat will stabilize at about 16 million acres, and that wheat production during the next 5 years will average 6 million metric tons--220 million bushels. During this period there will be high and low years depending upon the climatic conditions. Wheat consumption is increasing in Turkey and during the next 5 years should about equal the average production. Turkey probably will not be a net exporter of soft wheat. Increased wheat yields through improved practices will come very slowly and will probably no more than equal population increase.

Barley production should average about 2.5 million tons (115 million bushels) and, until the livestock feeding program really gets under way, there will probably be an exportable surplus of about 125,000 tons (5 million bushels) in good years.

An optimistic estimate for cotton production during the next 5 years would place acreage at about 1.5 million acres and production at 140,000 metric tons (645,000 bales). The textile industry is expanding and new mills now under construction will increase the domestic textile capacity to a point beyond the present production level.

There are possibilities of expanding the market for United States agricultural products in Turkey. Almost all the United States farm exports are now under programs, such as Public Law 480, the Agricultural Trade Development and Assistance Act of 1954, and Turkey will probably have a foreign exchange shortage for some time. However, Turkey has dollars; \$60 million to \$75 million of which comes from exports to the United States. But they will be allocated for the purchase of the United States goods for which there is the strongest demand.

## Turkey in the World Agricultural Market

### Nature and Competitive Aspects of Agricultural Trade

Agricultural products constitute 82 to 90 percent by value of Turkey's exports. Traditional important exports have been oriental-type tobacco, raisins, figs, filberts and other nuts, mohair, carpet wool, and opium. Wheat, barley, and



other grains have been exported during years of good cereal harvests, and imported in poor years. Cotton exports increased in value from 1948 to 1953, but have decreased in recent years. Tobacco has been by far the most important foreign exchange earner, followed by fruits, nuts, and vegetables.<sup>1</sup>

Turkey usually has not been an important importer of agricultural products. Normally, it imports tea, coffee, cocoa, fine wool, jute, and small amounts of other goods. But during years following poor cereal harvests, it has taken large imports of grains. Also, in recent years it has imported substantial quantities of fats and oils.

Almost half of Turkey's trade is with members of the European Payments Union (EPU). In 1955, trade with Communist countries increased, largely because of the availability of credit, but it decreased in 1956.

TABLE 1.--Foreign trade: Exports and imports by area of destination and origin, 1955 and 1956

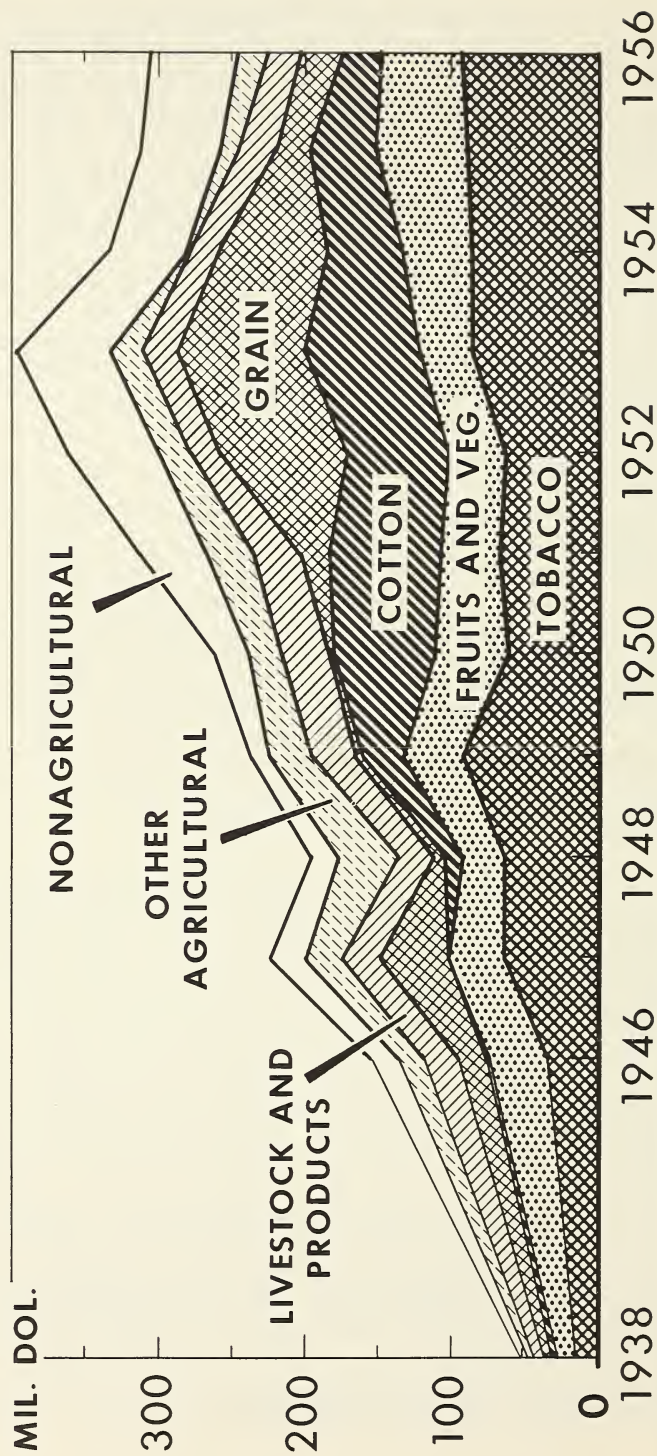
Area	Exports				Imports			
	1955		1956		1955		1956	
	<i>Million dollars</i>	<i>Per-cent</i>	<i>Million dollars</i>	<i>Per-cent</i>	<i>Million dollars</i>	<i>Per-cent</i>	<i>Million dollars</i>	<i>Per-cent</i>
United States...	48.6	15.5	59.9	19.6	111.3	22.4	85.8	21.1
OEEC <sup>1</sup> .....	154.2	49.2	153.1	50.2	211.0	42.4	204.4	50.2
Soviet area.....	68.6	21.9	59.9	19.6	91.3	18.3	59.4	14.6
Others.....	41.9	13.4	32.1	10.6	84.0	16.9	57.7	14.1
Total.....	313.3	100.0	305.0	100.0	497.6	100.0	407.3	100.0

<sup>1</sup>Organization for European Economic Cooperation.

Turkey's exports that are most competitive with United States farm products in the world market are wheat, barley, and cotton. Insignificant amounts of rice, corn, and citrus fruits have been exported in some years. Some other exports indirectly compete with United States farm products in the United States domestic market as well as to some extent in the world market. Tobacco is one such export. The United States is the biggest buyer of Turkish tobacco, normally taking about three-fourths of the export crop. It replaces domestic tobacco in the manufacture of cigarettes, and therefore offers competition to the American farmer. Also, there have been shifts between Turkish and American tobaccos on the European market, making them more directly competitive. Dried fruits and nuts are also competitive to United States domestic production. A large volume of nuts is imported by the United States from Turkey, but dried fruits do not enter the United States in substantial quantities.

<sup>1</sup> See Appendix I for detailed agricultural exports.

# TURKEY: Exports, by commodity groups, 1938 and 1946-56



In this survey, attention was centered on three export crops; wheat, cotton, and barley. These products are not entirely comparable with United States exports. Except for 1953 and 1954, between 50 and 100 percent of Turkey's wheat export has been durum wheat, which is not exported by the United States and is in short supply in the world market. Turkey's soft wheat is not of high quality; it is largely ungraded and contains much foreign matter.

The cotton exported from Turkey is also of low quality and suffers from lack of standardization; most of the better grades are used in the domestic industry.

Barley is competitive with United States exports for the brewery industry and for livestock feed in the European market.

During the past 5 years Turkey has exported an average of 473,000 metric tons of wheat compared to 7.8 million tons exported from the United States and 26.7 million tons (including wheat equivalent of flour) average world exports. (In 1953-54 Turkey was the sixth largest exporter of wheat). Turkey's barley exports during the past 5 years have averaged 126,000 tons; they have been one-eighth as large as average United States exports and only 2 percent of the world total. Cotton exports have averaged 64,000 tons in this period whereas the United States has exported 821,000 tons average, which was more than one-fourth of the total world market.

### Trade with the United States

Turkey has notably increased the volume of its agricultural imports from the United States since 1954, largely as a result of United States export programs. In 1956, Turkey was third in importance as an importer of United States farm products in the Middle East--being only surpassed by Israel and Egypt--and was in first place as a supplier of United States agricultural imports from that area.

United States agricultural exports to Turkey rose from an average of \$500,000 for the prewar years (1935-39) to \$36 million in 1956. At the same time, our agricultural imports from Turkey increased some 500 percent, from \$10 million to \$50 million. One-third of our total shipments to that country was agricultural commodities in 1956 compared with only 5 percent for the prewar years. Traditionally, agricultural commodities make up two-thirds of our total imports from Turkey.

Grains have consistently made up the largest share of our agricultural exports to Turkey in recent years. They accounted for 60 percent of the \$36 million in agricultural exports to Turkey in 1956. Approximately 11 million bushels of wheat were shipped that year. Following grains in importance are dairy products and cottonseed oil. Shipments of dairy products were valued at \$7 million in 1956; half of them were of butter. Turkey, usually taking little if any



United States fats and oils, took approximately \$4 million of cottonseed oil in 1955 and 1956.

TABLE 2.--Foreign trade: Value of Turkey's trade with the United States averages 1935-54, annual 1955 and 1956

Item	Average				Annual	
	1935-39	1940-44	1945-49	1950-54	1955	1956
United States exports to Turkey:	1,000 dol.	1,000 dol.	1,000 dol.	1,000 dol.	1,000 dol.	1,000 dol.
Agricultural.....	500	100	2,400	3,494	28,616	35,792
Nonagricultural.....	8,925	26,689	68,788	61,918	66,974	73,142
Total.....	9,425	26,789	71,188	65,412	95,590	108,934
United States imports from Turkey:						
Agricultural.....	10,200	18,400	47,200	45,600	47,301	50,324
Nonagricultural.....	4,648	6,759	13,036	24,385	15,246	22,992
Total.....	14,848	25,159	60,236	69,985	62,547	73,316
Trade balance <sup>1</sup> .....	-5,423	1,630	10,952	-4,573	33,043	35,618

<sup>1</sup>Excess of U. S. imports over exports shown by a minus sign.

United States statistics.

TABLE 3.--Foreign trade: Quantity and value of United States agricultural exports to Turkey, by commodity, 1954-56

Commodity	Unit	Quantity			Value		
		1954	1955	1956	1954	1955	1956
					1,000 dol.	1,000 dol.	1,000 dol.
Wheat, grain.....	bu.	2,896	7,282	10,776	4,683	12,357	19,827
Cottonseed oil, refined.....	lb.	0	27,116	21,045	0	3,912	3,697
Butter.....	lb.	0	0	5,537	0	0	3,599
Cheese.....	lb.	0	0	5,580	0	0	2,120
Cattle hides, wet....	Thous.	0	78	237	0	674	2,019
Nonfat dry milk.....	lb.	40	0	9,717	5	0	1,485
Rice, milled.....	lb.	0	0	22,135	0	0	1,412
Tallow, inedible....	lb.	0	0	10,119	0	0	860
Cottonseed oil, crude.....	lb.	0	0	1,045	0	0	170
Wheat, flour.....	cwt.	0	0	22	0	0	119
Gelatin, edible.....	lb.	2	79	3	14	109	13
Barley, grain.....	bu.	0	6,788	0	0	8,182	0
Oats, grain.....	bu.	0	3,476	0	0	3,113	0
Food for relief and charity.....	---	---	---	---	110	165	78
Other.....	---	---	---	---	231	104	393
Total agricultural.	---	---	---	---	5,043	28,616	35,792
Nonagricultural....	---	---	---	---	74,232	66,974	73,142
Total exports....	---	---	---	---	79,275	95,590	108,934

United States statistics.



While increasingly larger shipments of agricultural products have gone to Turkey in recent years, a relatively small amount was cash dollars sales. After exports under special programs are eliminated, only \$600,000 of the \$35.8 million total in 1956 was received through normal marketing channels. In 1955, these programs accounted for almost all of the \$28.6 million. Approximately two-thirds of our total agricultural exports to Turkey for both of these years were made under Titles I and II of Public Law 480.

In its imports from Turkey, the United States receives a variety of agricultural commodities. However, leaf tobacco has generally accounted for 80 percent or more of these shipments in recent years, and reached a peak of \$42 million (6.5 million pounds) in 1956. In fact, nearly 51 percent of all unmanufactured tobacco imported by the United States in 1956 came from Turkey; the figure was 47 percent for 1954 and 1955. Of the numerous other commodities of agricultural origin, filberts, pistachio nuts, and opium each exceed \$1 million in value.

TABLE 4.--Foreign trade: Quantity and value of United States agricultural imports from Turkey, by commodity, 1954-56

Commodity	Quantity			Value		
	1954	1955	1956	1954	1955	1956
	1,000 lb.	1,000 lb.	1,000 lb.	1,000 dol.	1,000 dol.	1,000 dol.
Tobacco, leaf.....	55,965	57,687	61,453	35,364	37,146	41,406
Filberts, shelled.....	3,234	7,145	4,341	1,440	3,159	2,550
Pistachio nuts.....	505	658	4,497	306	319	2,317
Opium.....	257	439	27	1,615	2,648	1,306
Licorice root, crude.....	8,159	13,315	10,577	405	639	457
Wool, unmanufactured, free.	90	781	620	48	515	399
Walnuts, shelled.....	1,434	1,165	673	579	555	376
Figs, paste.....	6,223	7,124	2,838	561	19	337
Sheep and lamb skins.....	152	30	824	71	3	319
Wool, unmanufactured, duti- able.....	0	167	208	0	141	220
Sausage casings.....	124	133	75	350	373	153
Apricot and peach kernels..	0	926	225	0	128	92
Figs, dried.....	330	424	385	64	97	89
Laurel, leaves.....	321	218	338	30	36	56
Canary seeds.....	11,939	4,909	248	711	530	24
Capsicum or red pepper....	1,101	591	93	176	70	18
Animal hair, raw.....	163	140	25	294	24	9
Beeswax, crude.....	1,271	188	0	213	97	0
Other.....	---	---	---	363	202	196
Total agricultural.....	---	---	---	42,590	47,301	50,324
Nonagricultural.....	---	---	---	22,128	15,246	22,992
Total imports.....	---	---	---	64,718	62,547	73,316

United States statistics.

## Agricultural Economy of Turkey

Agriculture is the basis of Turkey's economy. About three-fourths of the (1956 estimated) population of 24,500,000 are engaged in crop and livestock production. Many more persons are employed in the processing and marketing of agricultural commodities. Agriculture accounts for over 40 percent of the national income (over 50 percent in 1938) and almost nine-tenths of Turkey's foreign exchange earnings come from agricultural exports.

### Land Characteristics and Use

Turkey consists principally of the Anatolian Peninsula of Asia Minor. Three percent of the country (Thrace) is located in Europe. Turkey has a total area of 483,000 square miles (about 13 percent larger than Texas). It is bounded on three sides by the Black, Aegean, and Mediterranean Seas. Russia, Iran, and Syria border it to the northeast and south-east.



Typical scene in Turkey's important wheat-producing Anatolian Plateau. Wheat crop photographed here in mid-April 1957 shows the effects of the spring drought.

The Anatolian Peninsula is primarily a large semiarid plateau, rising from west to east to an elevation of almost 8,000 feet and is almost completely surrounded by a rim of mountains. Annual rainfall varies within the plateau from 8 to 14 inches. Almost all precipitation comes between October and June. Climatic conditions are highly variable from year to year, with the result that droughts are frequent.

Intermittent mountain ranges and streams within the plateau make irrigation possible in some areas. Soils are varied; they are largely from granite and limestone formations, although some alluvial soils are found in the valleys. Much of the plateau has coarse shallow soil, owing to slow soil formation and water and wind erosion. Some areas are alkaline and saline. Without exception, the soils are low in organic matter and lack phosphorous.

Between the rim of mountains and the Aegean and Mediterranean Seas are found fertile river valleys and coastal deltas. Here is a Mediterranean climate, where often spring floods are followed by summer droughts. Winters are mild and summers hot. Soils are more fertile, but lack organic matter. Some areas are poorly drained and alkaline.

To the north, the mountains drop sharply into the Black Sea, leaving only a narrow coastal strip in most areas. Rainfall is greater in this area and occurs throughout the year. In the northeast the climate is subtropical.

In the southeast, north of the Syrian border, there is another plateau, part of the watershed of the Euphrates and Tigris Rivers. Rainfall is slightly higher than in the Central Plateau.

Northeastern Turkey is mountainous with some small valleys. Precipitation is somewhat higher than on the plateau. Winters are long and cold, and summers very short.

About 70 percent of Turkey's land area of 76.7 million hectares (190 million acres) is considered as agricultural land; 29 percent is cultivated. The area under cultivation has increased from 18 percent in 1948 to 29 percent in 1956. Most of this was at the expense of pasture land, which accounted for 49 percent of the land area in 1948 but only 38 percent in 1956.

TABLE 5.--Land utilization, 1948 and 1956

Use	1948	1956	1956
	<i>Mil. ha.</i>	<i>Mil. ha.</i>	<i>Percent</i>
Area sown.....	9.5	14.6	18.8
Fallow land.....	4.4	7.9	10.2
Total cultivated.....	13.9	22.5	29.0 ✓
Vineyards.....	.5	.7	.9
Orchards.....	.7	.7	.9
Olive groves.....	.3	.5	.6
Total tree crops.....	1.5	1.9	2.4 ✓
Pasture.....	38.3	29.5	38.0
Forests.....	10.5	10.4	13.4
Waste and other land.....	13.5	13.4	17.2
Total.....	77.7	77.7	100.0

The amount of irrigated cropland has never been accurately determined because much of the irrigation is carried on under primitive systems and is only supplemental or partial irrigation. Official reports from Provinces show

2,119,000 hectares (5.2 million acres) irrigated in 1955, a large part of which represents use of runoff water in the early spring. There is probably less than 1 million hectares under permanent irrigation systems. Government-financed irrigation projects thus far have brought an estimated 350,000 hectares under controlled irrigation.

TABLE 6.--Irrigated land: Principal use by crop, 1955

Crop	Irrigated area	Percent of total irrigated land	Percent of total crop irrigated
	1,000 ha.	Percent	Percent
Grain.....	1,005	<sup>1</sup> 47	8
Orchards and vineyards.....	317	15	24
Cotton.....	228	11	36
Sugar beets.....	96	5	79
Pulses.....	69	3	14
Potatoes.....	52	2	49
Tobacco.....	31	2	18

<sup>1</sup>In 1953, 26 percent of the irrigated land was in wheat; in 1955, only 20 percent was in wheat.

## Characteristics of Production

Turkey produces a wide variety of agricultural products. Wheat is the principal crop and is grown in every Province; however, more than 77 percent of the wheat is grown under dryland farming conditions in the Anatolian Plateau, 55 percent of it in 10 Provinces. It is the traditional food crop of the Turkish farmer, and in years past only a small percentage usually moved in commercial channels. With the recent expansion in production, improvement of marketing facilities, and price supports, however, it has become important as a cash crop.

Most other crops in Turkey are regionally localized. Turkey is divided into nine agricultural regions, based principally upon physiographic and climatic differences which have resulted in different types of farming areas. (On the map boundaries have been adjusted to include complete Provinces).

Three regions are included in the Central Plateau (Nos. 1, 8, 9). Because of low and uncertain precipitation and its seasonal distribution, grain production must be limited largely to small grains.

The Aegean region (No. 2) is one of the best areas for cotton and tobacco. Agricultural production is diversified here, including figs, raisins, anise, olives, valonia extract, fruits, vegetables, and grains.

The Marmara region (No. 3) specializes in olives, figs, almonds, citrus fruits, grapes, silk, and grains.

The Mediterranean region (No. 4) is important in the production of cotton, citrus fruits, peanuts, bananas and rice and other grains.





Crop production in the North East region (No. 5) is practically limited to wheat and barley, except in some of the sheltered valleys. Livestock production is very important in this area.

In the Southeast region (No. 6) are found the pistachio orchards, most of which are grafted wild trees. Cotton and tobacco are developing in this area although, until recently, lack of communication has left agriculture in the stage of nomadic husbandry, with some cultivation of cereal crops.

The Black Sea region (No. 7) produces tobacco, filberts, walnuts, tea, corn (principal food crop in this region and only area in which wheat is not the most important grain crop), and fruits.

Livestock are important throughout Turkey. In the eastern regions, livestock raising is the major farm enterprise. Before the improvement of the transportation system, livestock products traditionally were the commodities produced for cash income by the Anatolian farmer. However, pastures are seriously overgrazed, almost no forage crops are produced, and animals are carried through the winter principally on straw, so livestock production is inefficient.

Sheep are the most numerous livestock. The wool is coarse--not suitable for the textile industry, but is used in rug making. Fine wool is imported for the wool textile mills. Goats are the next most important livestock. Turkish mohair from the Angora goat is considered the finest in the world; however, the quality has deteriorated in recent years. Angora goats are found principally in the Central Plateau and eastern Turkey.

## Organization and Practices

There are approximately 40,000 farm villages in Turkey, most of which are composed of 50 to 100 families. The arable land surrounding the village is privately owned, but the grazing land is considered communal land, subject to unlimited use by all members of the village<sup>2</sup>. Almost 95 percent of the families are owners of their farms. Farms are small and fragmented. Of the estimated 2.5 million farms, almost 10 percent are less than one hectare, over 60 percent are less than 5 hectares, and only 1.5 percent over 50 hectares. There are about 6,500 farms larger than 100 hectares. Farm size varies among regions, with the average farm somewhat larger in the dry farm areas. However, many of the very large farms are found in the better agricultural areas. This is especially true in the Chukrova Delta of the Mediterranean region. The Ministry of Agriculture owns and operates 20 state farms, principally in the Central Plateau, which contain a total of 262,000 hectares.

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<sup>2</sup> Much of the expansion of grain production took place on these communal grazing lands. Some members of the village just took over use of these lands--the village usually did not hold legal title.

TABLE 7.--Principal crops: Area and production, averages 1934-38 and 1946-50, annual 1951-56

Crop	Average		Annual					
	1934-38	1946-50	1951	1952	1953	1954	1955	1956
AREA	1,000 hectares	1,000 hectares	1,000 hectares	1,000 hectares	1,000 hectares	1,000 hectares	1,000 hectares	1,000 hectares
Wheat <sup>1</sup> .....	3,450	4,206	4,890	5,400	6,410	6,405	7,060	7,335
Barley <sup>1</sup> .....	1,775	1,806	2,059	2,312	2,437	2,500	2,640	2,612
Total grains.....	6,339	7,735	8,805	9,868	11,077	11,271	12,078	12,370
Tobacco.....	56	124	121	130	159	156	173	172
Cotton.....	250	301	642	675	605	582	625	637
Sugar beets.....	34	46	51	48	53	71	97	122
Potatoes.....	56	67	86	102	105	109	109	110
Pulses.....	415	397	418	436	463	460	500	508
Grapes.....	306	556	593	649	671	670	707	(2)
PRODUCTION	1,000 metric tons	1,000 metric tons	1,000 metric tons	1,000 metric tons	1,000 metric tons	1,000 metric tons	1,000 metric tons	1,000 metric tons
Wheat.....	3,423	3,630	5,600	6,447	8,000	4,900	6,900	6,400
Barley.....	1,931	1,725	2,700	3,189	3,640	2,400	2,985	2,900
Total grains.....	6,802	7,070	10,679	12,242	14,344	9,624	12,433	11,818
Tobacco.....	72	95	89	89	118	102	120	116
Cotton lint.....	55	78	150	165	139	142	157	165
Sugar beets.....	394	718	1,363	1,069	1,170	1,200	1,736	2,000
Potatoes.....	173	446	676	873	1,000	1,000	1,116	1,100
Pulses.....	325	330	411	478	502	419	465	476
Grapes.....	885	1,304	1,386	1,634	2,000	2,247	1,895	(2)
Figs, fresh.....	146	102	107	118	105	107	100	(2)
Filberts.....	28	59	93	78	46	123	53	140
Olives.....	245	233	226	398	254	532	200	539

<sup>1</sup>Official estimates for 1957: Wheat 7.1 million hectares, barley 2.78 million hectares, cotton 589,000 hectares.<sup>2</sup>Not available.

Statistics from official Turkish publications.

TABLE 8.--Livestock: Number of kinds, average 1946-50, annual 1954 and 1956

Livestock	Average 1946-50	1954	1956
	1,000 head	1,000 head	1,000 head
Sheep.....	23,992	26,808	27,974
Ordinary goats.....	13,734	16,121	16,486
Angora goats.....	3,940	4,958	5,027
Cattle.....	9,983	10,868	11,546
Buffaloes.....	926	1,071	1,075
Horses.....	1,109	1,214	1,257
Donkeys.....	1,674	1,710	1,772
Mules.....	101	117	131
Camels.....	107	89	66

Statistics from official Turkish publications.

Agricultural techniques are generally simple and traditional, with much hand labor. Oxen, buffaloes, and horses are the principal sources of power. In 1947 there were only 1,700 tractors in Turkey, but by 1953, close to 40,000 had been imported. At least three-fourths of these probably found their way to the village farmer, as well as substantial number of combines, seed drills, plows, and other equipment. This would still leave more than 98 percent of the farms without tractor power. However, the farms with tractors are somewhat larger than those using only animal power, so the percentage of land under mechanization is greater than the percentage of mechanized or partly mechanized farms<sup>3</sup>.

Most of Turkey's soil is deficient in organic matter and phosphate. In most areas animal manure is used for fuel instead of being applied to the land. Very little of the land (except on state farms) receives chemical fertilizers. Use of improved seed and control of disease and pests are practices which until recently were almost unknown by the average Turkish farmer. The Government now has a seed-distribution program, especially in wheat, and a substantial amount of wheat seed is being treated against smut. The insect problem in cotton, especially serious in the Chukrova Delta, is recognized but not as yet solved.

Research in livestock nutrition and breeding and in range management has only recently been given emphasis in Turkey. Thus, it will be some time before its effect will be felt on the average farm.

Credit is available to most farmers in Turkey. The Agricultural Bank is the principal source, supplying at least 75 percent of agricultural loans. Volume of its loans, and that of local cooperatives associated with it, increased more than 6,000 percent from 1937 to 1954. Most loans--77 percent in 1954--are for 1 year to finance crop production. The remainder are for purchase of equipment and land. The Na-

<sup>3</sup> A study made by the University of Ankara in 1952 indicated that a sample group of farms in the Central Plateau had increased in size 43 percent from 1948 to 1952 through mechanization.



tional Office for Agricultural Equipment also supplies agricultural machinery, spare parts, fertilizer, and insecticides on credit. And some credit is advanced by the Government Sugar Company to sugar beet growers.

Improved roads and trucks (and tractors with trailers) have greatly changed the commercial character of agriculture, especially in the Central Plateau, and have contributed to the great expansion of wheat acreage. The farmer can now sell his surplus production (if rainfall has been sufficient to produce a surplus) and move it to the Toprak<sup>4</sup> buying station. He can also buy things he wants, even flour, from urban centers. The Government's policy of distributing wheat for seed and even for food after years of poor harvest has relieved many of the farmers of the traditional necessity of storing 1 or 2 years wheat needs.

### Agricultural Development in Turkey

The story of agricultural development in Turkey must be written with care. On the one hand, when one reviews the tremendous economic, social, and political progress Turkey has made in the 34 years since becoming a republic--and especially the impetus given to agricultural production and the processing and manufacturing of agricultural raw materials in the past 8 to 10 years--one becomes imbued with the optimism which has permeated the thinking and planning (until recently at least) of most Turkish officials and some foreign economic advisors. On the other hand, when one attempts to present the difficulties that Turkey's agriculture is currently facing and the problems resulting from overoptimism and overexpansion, one is in danger of making the picture too bleak and discrediting the real agricultural advancement which has taken place.

However, some incongruous facts must be considered. Turkey has increased the area in wheat 113 percent over the 1934-38 average. Yet, in the past 2-1/2 years Turkey has imported about 1-1/4 million tons of wheat.

It has increased the area in cotton 155 percent over the 1934-38 average. However, cotton exports have declined every year since 1953. They were only 50 percent of the 1953 volume in 1955 and 35 percent in 1956. Yields have fallen off and production costs are rising. There is evidence that there is a substantial reduction in acreage of the 1957 crop.

Under a commercial grain storage program (which was begun after the big 1953 wheat crop), Turkey has completed, or has under construction, storage facilities for over 2 million tons of grain. In April 1957 there was in storage only an

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<sup>4</sup> Toprak is the Office of Soil Products, an autonomous agency which reports to the Minister of Economy. It is responsible for administering the support price for grains, and it purchases grain from farmers for the supply of urban centers. It is responsible, too, for all foreign trade in grains.

estimated 45,000 tons, practically all of which was imported wheat. A freighter unloading wheat at the Istanbul port was transferring it to lighters because the modern, completely automatic terminal grain silo--capacity 34,000 tons--was designed for export not import, and new equipment was not yet installed.

Turkey has imported close to 40,000 tractors since 1947. This farm machinery was an important factor in the great expansion of grain acreage. Brandow<sup>5</sup> attributed 17 to 26 percent of the increase from 1948 to 1953 to mechanization. The Central Statistical Office reported that 37,000 tractors were in operation in 1955. However, in discussing the tractor situation, agricultural technicians and farmers report the same problems: (1) Shortage and high cost of spare parts and tires; parts for some of the 132 different makes of tractors imported into Turkey are unavailable, and the 40-percent tax on all imports helps make spare parts and tires very expensive. (2) Shortage and high cost of fuel, especially since the Suez crisis. (3) Tractors in poor condition; after 5 or 6 years of use, with improper operation and maintenance, many tractors are in a condition where operation is very inefficient, but replacement is impossible when many farmers are still in debt for their tractor and when crops have been poor and foreign exchange is short.

On a trip the author took through the Central Plateau, between Ankara, Konya, and Eskisehir, literally thousands of farmers were observed plowing their fields with horses, oxen, or buffalo. Only 3 tractors were seen working in the fields between Ankara and Konya and (with the exception of a state farm visited) none was seen between Konya and Eskisehir. In the larger villages where there are repair shops there were always a number of tractors to be seen.

## History

At the time of the establishment of the Turkish Republic in 1923, economic conditions had stagnated under the rule of the Ottoman Empire. The system of agricultural production, especially on the Anatolian Plateau, was very little different from that practiced in Turkey for more than a thousand years. Some development had taken place in the coastal areas in the production of tobacco, cotton, and dried fruits. The new president, Mustafa Kemal Ataturk, who had become a hero through his defeat of the Greeks and the overthrow of the Sultan, broke many political and social ties with the past. The Moslem Caliphate was abolished, schools were placed under the state instead of the church, and church law was replaced by civil, criminal, and commercial codes based on Western models. Time reckoning was adjusted to the international clock and the Gregorian calendar, and the

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<sup>5</sup> G. E. Brandow, Agricultural Development in Turkey, U. S. Foreign Operations Administration, December 1953.

metric system of weights and measures was adopted. The language was revised and a modified Latin alphabet was established. The fez was abolished and Western dress for men was prescribed.

An ambitious economic development program was initiated. However, emphasis was on industrial expansion rather than on agricultural improvement, in spite of the heavy dependence of the Turkish economy on agricultural production. At first, economic development was encouraged through private domestic investment--foreign ownership and concessions had been abolished. However, when private enterprise failed to produce the desired results--particularly difficult during the World Depression--the Government turned to a system of state enterprise, "etatism." In 1933 the Sumerbank was created as a combined bank and holding company to establish, finance, and manage industrial units (including mills processing agricultural products). This was followed by the Etibank in the fields of mining and power.

Some programs to improve agricultural production were sponsored by the Government during this period, from the founding of the Republic to World War II. Several experimental stations were established both for crop and livestock improvement.<sup>6</sup> Agricultural schools were instituted. Farmers' cooperatives were organized to improve grading, standardization, and marketing of some farm products. The farmers' tithe was abolished and direct taxes reduced. Price supports were authorized for cereals and some other farm products. Twenty state farms were established as combined experimentation, demonstration, and production projects. Four sugar factories were built and production of sugar beets encouraged. A program of mechanization was initiated and 7,000 tractors had been imported by 1930. (Gasoline was imported free of duty for agricultural use. This led to reselling of gasoline, so the Agricultural Bank was ordered to repurchase all gasoline tractors.) In 1947 there were less than 2,000 tractors (Diesel) in Turkey. Agricultural development, especially mechanization, suffered a setback during the World Depression in the thirties and World War II.

However, substantial progress was made. Between 1927 and 1944, reported production of wheat increased 93 percent, cotton 203, corn 91, and sugar beets 1,073 percent.

### Progress of Recent Programs

At the close of World War II, Turkey was ready to embark on an expanded program of agricultural development with somewhat better prospects than many underdeveloped countries of the world. Per capita gross national product was \$180 the highest in the Middle East. The population, estimated at 20 million, was increasing at a rate of 2-1/2 percent, owing to improvement of health and living conditions. Literacy was not high but education was increasing. Seventy-

<sup>6</sup> At the present time (1957) there are 11 crop experimental stations and 14 livestock improvement stations in Turkey.



eight percent of the population was engaged in farming, but land resources were abundant and many areas were relatively underdeveloped. The amount of agricultural land per person was about 2.5 hectares, compared to an average of one-fifth hectare throughout Asia. A high percentage of the land was owned and operated by small farmers or held in common by the villages.

The same period marked the rise to power of the Democratic Party in Turkey, with a platform of increasing agricultural production and exports, raising farm prices, and improving rural conditions. Maintaining support of the rural vote has since been one of the principal determinants of the Turkish Government's agricultural policy.

The devaluation of the Turkish lira, in September 1946, was another action designed principally to increase exports and thereby encourage agricultural development.

With the granting of United States aid in 1948, Turkey was provided with investment capital necessary to move ahead with programs for the development of its agricultural economy. This aid came at a time when the world supply of food and fiber was short, and was coupled with a program to support Turkey as a military ally.

To accomplish the most progress in the shortest time, it was decided to emphasize the expansion of grain production, especially wheat, in the Anatolian Plateau. A vast mechanization scheme was initiated and nearly 40,000 tractors and supporting equipment had been imported by 1953, most of which were designated for the surplus wheat producing areas of the Central Plateau. Basic grain support prices (already above the market prices) were increased and Toprak buying standards were relaxed, so that the effective price increase was much greater. The number of Toprak buying stations was increased; which, accompanied by the rapid expansion of roads throughout the country, greatly extended marketing facilities for grains. Credit for land improvement, machinery purchase, and crop production was sharply expanded; agricultural loans increased over 800 percent between 1946 and 1954. Farmers were assured that they would be supplied seed and even wheat for food in case of crop failure, so farm shortage of grain was discouraged.

Increased production of some other crops and expansion in other areas were also encouraged. Likewise, industries processing agricultural products were given special emphasis. Irrigation expansion was planned; however, many of these projects were large scale, requiring big expenditures of capital, and progress has been slow<sup>7</sup>.

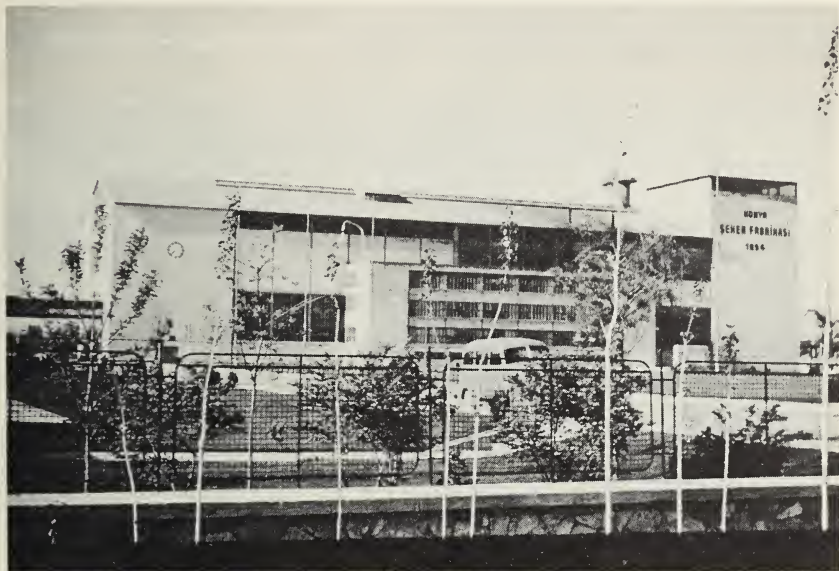
Cotton production was expanded, largely because of increased world prices during the Korean War, but also as a

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<sup>7</sup> The Seyhan Dam on the Chukrova Delta has been completed and was to irrigate an additional 156,000 hectares. However, the drainage problem must be solved before more water can be put on the land. It is evident that overly optimistic estimates were made of the economic returns from irrigation in this area.



result of increased mechanization, some irrigation and drainage development, control of malaria on the Chukrova Delta, and improvement of marketing organizations. The textile industry has also expanded rapidly during the past 10 years. In 1949 there were 241,666 spindles in operation in Turkey, of which 126,000 were state owned and 115,660 private. Production was 441 million meters of cotton goods. In 1957, there were 684,504 spindles in operation--an increase of almost 200 percent. (Almost all the expansion was in private mills.) Production had increased to 380 million meters.



Sugar factory in Konya, Turkey, one of the country's 11 new sugar factories. Sugar production has expanded greatly in the past few years in line with the country's efforts to develop its agricultural resources.

Two sugar beet factories had been constructed by 1926 and two additional by 1934. Eleven new factories were included in Turkey's agricultural and industrial program. These had been completed and were in operation by 1956, although four were having their first trial run. Sugar production increased from 97,000 tons in 1948 to 277,000 in 1956; nearly a 200-percent increase. A great amount of capital has gone into these plants and it is doubtful that the high level of investment has been economic.

However, some other segments of Turkey's agriculture, including its traditional foreign exchange earners--tobacco, dried fruits, and nuts, received only incidental attention in this huge development program. The livestock enterprise was also neglected, although for generations it had been the

source of the Anatolian farmers' cash income and, as late as 1948, was next to tobacco, dried fruits, and nuts in foreign exchange earnings. Turkey's pasture land, already seriously overgrazed, was reduced one-sixth between 1949 and 1954. Official statistics indicate that, in spite of this, livestock numbers (except camels) increased during this period--goats by 20 percent and sheep, cattle, horses, and buffaloes by 10 percent. However, a study<sup>8</sup> made in 1952 of 448 villages in all regions of Turkey (except the Northeast) indicated that livestock in these villages had decreased--work animals by as much as 60 percent. The decrease in exports of livestock products (except mohair) of almost 50 percent since 1949 and conversations with farmers and agricultural officials also indicate that there has in reality been a substantial drop in livestock numbers.



New milk-processing plant, Ankara. Turkey hopes to provide outlets for farmers' milk supply and thus aid expansion of the livestock industry.

More recently, Turkey has given some emphasis to improving its livestock industry. However, development of processing plants has moved much faster than improvement of livestock production. Four ultramodern meat processing plants have been constructed and one is now in operation, although it is operating far below capacity. These plants were designed for a livestock industry more highly developed than Turkey's will be for a number of years. Four milk pastuerizing plants have been built in the largest cities of Turkey. There are also two modern milk processing plants (not including the recombining plants operated by the United States Military Mission). These are not in operation as yet and have the same difficulty as the meat processing plants--lack of sufficient agricultural raw materials.

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<sup>8</sup> Economic and Social Aspects of Farm Mechanization in Turkey, University of Ankara, 1953.

The agricultural development program of Turkey has received a tremendous boost through economic and technical aid from the United States. From the program's initiation in 1948 to the end of fiscal year 1957, Turkey received \$526 million for economic development and defense support; about \$355 million in grants, \$154 million in loans, and \$17 million in conditional aid. (A large amount of military aid has also been granted to Turkey each year.) Turkey also received \$71.5 million of drawing rights in EPU as a result of United States aid. Technical cooperation funds had amounted to around \$2 million a year for a total of \$14.9 million by the end of fiscal 1957. Of the total United States aid, \$113 million economic aid funds and \$2.6 million technical cooperation funds had been programmed for agricultural development through 1956.

As a result of this large development program over 6 million hectares of additional land were brought under cultivation. Area in wheat increased 53 percent, in barley 35 percent, and in cotton 194 percent between 1947 and 1953. Increases were also shown in the area planted to other grains, sugar beets, potatoes, pulses, and fruits.

With the vast expansion in cultivated area and blessed with better than average rainfall during 1951, 1952, and 1953, Turkey's agricultural production expanded rapidly, reaching a high point in 1953. In this year the agricultural production index was 190 compared with prewar. These bounteous harvests made it possible for Turkey to increase exports sharply. The total value of agricultural goods exported in 1953 was 145 percent above the 1946 value. The greatest increase occurred in grains and cotton--as was planned in the Government's agricultural development program. These crops

TABLE 9.--Exports: Quantity and value of principal agricultural commodities, 1946, 1953, and 1956

Product	1946		1953		1956	
	Quantity	Value	Quantity	Value	Quantity	Value
	<i>Metric tons</i>	<i>1,000 dol.</i>	<i>Metric tons</i>	<i>1,000 dol.</i>	<i>Metric tons</i>	<i>1,000 dol.</i>
Wheat.....	33,727	4,327	600,604	58,677	176,875	17,500
Barley.....	133,523	12,043	159,869	12,456	163,133	8,975
Cotton.....	197	168	100,625	78,655	34,213	26,428
Tobacco.....	28,571	34,304	71,709	85,265	59,518	93,214
Dried fruits and nuts	---	39,603	---	37,241	---	54,713
Total agricultural.	---	136,171	---	333,786	---	246,282

<sup>1</sup>Largest export of wheat came after the 1953 harvest--953,000 tons in 1954. More than 1 million tons were exported from the 1953 crop.

equaled or exceeded tobacco in value of exports during this period. Suddenly, with exports of 1 million tons of wheat, 160,000 tons of barley, and over 100,000 tons of cotton, Turkey became a major world exporter of these crops, attaining sixth place in wheat, ninth place in barley, and sixth place



in cotton. Per capita gross national product went up to \$227, an increase of 26 percent over 1948.

Following the 1953 crop harvest, Brandow<sup>9</sup> analyzed factors affecting the agricultural expansion between 1948 and 1953. Of the 75-percent increase in cereal production, he attributed 36 percent to increased area, 7 to improved practices, and 32 to better-than-normal weather. Of the 115-percent increase in cotton production, 57 was attributed to increased area and 58 to improved practices. Weather was poor in the cotton areas in 1953 and reduced production 15 percent from 1952. Brandow's outlook for the future was more reasonable than that of many of his contemporaries: "Prospects for further agricultural growth (with some unavoidable setbacks in years of unfavorable weather) remain bright, but they depend much less upon continued expansion of area than upon the application of technology and management to agriculture."

This picture of agricultural production and exports in 1953 made such an impression on the minds of most Turks and many people in other countries that its influence has lasted through 3 years of much-lower-level agricultural production. Drought came to the Anatolian Plateau in 1954, and in 1955 and 1956 rainfall was below average in most areas. This is fairly common; the Turkish farmer traditionally kept 1 or 2 years supply of wheat on hand for such a disaster. In centuries past, whole populations have had to migrate from some areas of the Anatolian Plateau during prolonged droughts. Drought occurred in the late twenties, in the early forties, and in 1949. How often it comes or how many years it will last is indeterminate; farmers can be sure only that there will be years of low rainfall. But Turkey's economic development plans did not take this into consideration.

Since 1953, this unfavorable weather has cut grain production sharply, and reduced world prices and increased production costs have caused cotton production to level off. In the short span of 1 year Turkey shifted from a big exporter of grain to a sizable importer and has imported grain every year since 1954, most of which has come from the United States. Cotton exports had fallen off almost 65 percent by 1956.

However, during all this period Turkey's stable exports--tobacco and dried fruits and nuts--continued to expand. In 1956, tobacco exports were the greatest in value in Turkey's history and the value of dried fruits and nuts in that year was exceeded only in 1955.

### Current Development Programs

The Turkish Government is vitally interested in increasing agricultural production in every possible field, so that more exports may be available to provide the foreign exchange

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<sup>9</sup> G. E. Brandow, *op. cit.*



so badly needed to finance its economic expansion program. At the same time the income and level of living of the rural population must be improved. Except for these common objectives there does not seem to be a coordinated program for agricultural development in Turkey. Closer coordination appears to be needed between the many different, more or less independent governmental agencies which are concerned with the production and processing of agricultural commodities in Turkey.

The Ministry of Agriculture is charged with crop and animal production. However, Toprak, an autonomous agency which reports to the Ministry of Economy, administers the support price on cereals, does almost all buying of grain for distribution to urban centers, does all exporting and importing, controls grain storage, and also purchases all opium produced. The Agricultural Bank administers farm credit. The National Office for Agricultural Equipment handles much of the distribution of machinery and other farm supplies--on credit. The Ministry of Monopoly makes all purchases for domestic manufacture and administers the support price for tobacco and handles the marketing of tea and coffee. Sugar beet production is sponsored by the State Sugar Beet Company.

There are four semiofficial unions of farmers cooperatives--one in the Aegean region for cotton, figs, raisins, and olives; one in the Chukrova Delta for cotton; one for filberts; and one for pistachios. These administer support prices and handle the marketing for their members.

The Sumerbank controls state textile mills. The Fish and Meat Office develops livestock marketing.

In 1955 the Ministry of Agriculture prepared a "Plan for Agricultural Development in Turkey 1955-60" which was officially released by the Foreign Office. This plan called for increasing area in crops each year: 150,000 hectares for cereal crops, 20,000 for pulses, and 60-100,000 for industrial crops. The amount of fertilizer applied to crops was to increase from 75,700 tons in 1955 to 1,730,000 tons in 1960. Additional land was to be brought under irrigation each year; 170,000 hectares in 1955 up to 1,000,000 to be added in 1960.

The plan was not a really serious program because goals were set which were beyond possibility of achievement and there was no action program to carry it out. However, the end product of this plan--projected expansion of agricultural exports--became the basis for the financing of Turkey's economic development. These exports were to earn increasing amounts of foreign exchange each and every year between 1956 and 1959. Total value of agricultural exports was projected to reach more than \$536 million Turkish liras by 1959 compared to \$321 million in 1953.

During the past 3 years Turkey has found itself in a difficult economic position. Investment has continued in industry, transportation, public works, electric power projects,

TABLE 10.--Exports: Quantity and value of principal agricultural commodities, as plan for agricultural development, 1956-59

Commodity	Quantity				Value
	1956	1957	1958	1959	1959
	1,000 metric tons	1,000 metric tons	1,000 metric tons	1,000 metric tons	Million dollars
Total grain.....	1,671	1,880	2,432	2,812	189
Wheat.....	1,353	1,500	1,831	2,000	140
Barley.....	150	100	175	225	11
Rye.....	40	90	125	170	9
Corn.....	50	100	200	300	18
Cotton.....	100	110	130	140	125
Tobacco.....	70	70	75	80	109
Mohair.....	4	4	4	4	9
Dried fruits and nuts	90	95	95	97	41
Oil seeds.....	152	178	205	228	23
Pulses.....	12	23	40	71	10
Animal products.....	19	24	25	25	22
Other.....	---	---	---	---	9
Total agricultural exports.	---	---	---	---	537

and agricultural industries--especially grain storage, food processing, and textiles--requiring a high level of imports. At the same time, a reduction in exports has created a serious unfavorable balance of trade; \$143 million in 1954, \$185 million in 1955, and \$102 million in 1956. Turkey's foreign debt has reached \$400 million. The Turkish lira has been maintained at the official level of 2.80 to \$1.00, but on the free market it has fallen to one-third to one-fourth of that value.

The high level of investment has increased domestic incomes. This, along with a liberal credit policy, has created an excessive pressure of demand. This situation has been aggravated by agricultural production and industrial output in many sectors failing to reach anticipated levels, making a shortage of consumer goods. Wholesale prices has risen from an index of 107 in 1953 (1948 = 100) to 159 at the end of 1956. Cost of living index went from 113 to 157 in the same period. Per capita gross national product fell to \$213 in 1955, owing to reduced agricultural production.

To help meet this situation the Government has taken measures to encourage agricultural production and export. It has established support prices for the major commodities. For grain, prices are fixed in June of each year, and Toprak is required to purchase at these prices wheat, barley, oats, rye, corn, and rice offered for sale. Prices are adjusted according to quality. In June 1957 the Government increased support prices for grains--33-1/3 percent for wheat, 27 percent for barley and oats, and 28 percent for rye. The estimated average purchase price of soft wheat is 37 cents per bushel and for durum 41 cents per bushel.

Prices for cotton lint are supported by the two unions of cotton cooperatives. These were increased 25 percent for the 1957-58 season over the previous year. (57 cents per

pound for Acala #1 in Izmir.) This is passed on to the manufacturer for cotton used domestically, but losses are absorbed by the unions for cotton exported. The Tobacco Monopoly makes purchases at fixed prices for domestic manufacture. Prices are not supported or fixed for tobacco for export but there is a producers' bonus of 4 cents per pound.

Fixed prices are paid to sugar beet producers by the Turkish Sugar Company. Opium and tea are also purchased at fixed prices. And support prices are established for raisins, dried figs, olive oil, filberts and pistachio nuts.

Exports are encouraged through export subsidies, which are allowed on cotton, raisins, olive oil, fruits, vegetables, meats, and many other items. Export premiums on figs are allowed to certain countries. Premiums up to 85 percent of value are authorized with highest premiums to dollar and sterling areas and to countries of the European Payments Union. Cotton is authorized a 35-percent subsidy. Since Toprak exports all grain and can do so at prices lower than purchase costs, grain exports have been subsidized since 1954. Principal exports not granted subsidies are tobacco, nuts, and mohair.

A large part of Turkey's agricultural trade is now covered by various types of bilateral agreements. Such agreements are in effect with West Germany, Italy, Great Britain, France, Japan, the Netherlands, Lebanon, Yugoslavia, Czechoslovakia, Bulgaria, and others, but not with the United States. These may take the form of a rather general agreement listing the products to be bought and sold, with some measure of quantities. Such agreements may be accompanied by payments agreements designed to keep trade in balance; arrears agreements set up to pay off gradually Turkey's foreign exchange arrearages; and, more rarely, credit agreements, in which other countries agree to furnish products to Turkey, with repayment expected through future exports.

The Government has discouraged imports by imposing (in 1956) an import tax up to 40 percent on almost all items (principal exemption was PL 480 wheat). The unfavorable trade balance dropped from \$185 million in 1955 to \$102 million in 1956. This reduction in imports to a large extent was also due to lack of foreign exchange and reluctance of other countries to extend more credit to Turkey.

Measures to control bank credit were also instituted in 1956. Volume of credit still increased in 1956 and the first part of 1957 but at a slower rate.

A Ministerial Committee has been empowered to allocate investment funds to government-controlled and other enterprises so as to supervise more closely the utilization of scarce resources; the intention is that new investment will not be allowed to impede the completion of projects already started.<sup>10</sup> In agriculture, emphasis is being placed on the

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<sup>10</sup> Discussions with representatives from West Germany in August 1957 regarding new development projects tend to indicate that this committee may not be allowed to be effective.



completion of irrigation and flood control projects (including necessary drainage systems in some areas) and increasing the supply of agricultural machinery and spare parts. New fertilizer plants are expected to come into operation this year. Efforts are being directed toward making the operation of some of the food processing plants more effective.

Most government officials in the agencies connected with agricultural development appear to recognize that real improvement of Turkey's agriculture depends upon (1) the development of more productive varieties of crops adapted to the environment, (2) increased fertilization--including use of manure and cover crops, (3) better rotations--especially in the Central Plateau to provide pasture and forage for livestock, (4) improved pasture and forage crops adapted to the climate, (5) disease and pest control, (6) improved cultural practices, (7) water conservation and improved irrigation practices, (8) soil conservation and reforestation, (9) better grading and standardization, and (10) improved marketing practices. Also, improvement programs for Turkey's specialty crops--tobacco, dried fruits, and nuts--require strengthening. This, of course, means increased research, extension, and vocational education. The budget of the Ministry of Agriculture, \$36 million in 1957, was increased 17 percent over 1956 to expand the work in these areas. Some progress is being made but it will be several years before agricultural production is substantially increased through these means.

## Important Competitive Agricultural Products

### Grain: Wheat and Barley

Production. --Almost 90 percent of the cultivated land in Turkey is devoted to grain production--current crop or fallow. Of this grain area, 59 percent is in wheat and 21 percent in barley. It has been estimated that on the average 60 percent of the wheat that is marketed is soft wheat and 40 percent durum. A much higher percent of the wheat consumed on the farm is soft wheat. Durum wheat is produced in the coastal areas, the interior of Thrace, southeastern Anatolia, and at the edges of the Central Plateau. The central Anatolian Plateau is the principal soft wheat area. The major part of the barley production is also on the Central Plateau.

Most of the grain on the plateau is grown under a system of cropping and fallow in alternate years. Seeding is in the fall, unless there are no fall rains. If not completed then, it continues through the winter (if open) and into the spring. Harvest usually begins in June but may be delayed by dry or cold weather. Harvest in the coastal areas begins a month earlier.

Area sown. --The north- and south-central regions of the Anatolian Plateau are the most important wheat areas in



Turkey, accounting for 48 percent of the total land in wheat in 1953. It was also in these areas that the greatest expansion occurred. The rate was also high in the southeast region. Area in wheat in these three regions increased 59 percent between 1948 and 1953 compared to only 24 percent in the coastal regions. Most of the expansion of area in the plateau was at the expense of pastureland. In the coastal regions some pasture was plowed up but also fallow land was reduced.

TABLE 11.--Wheat: Area and percent increases, by region, 1948 and 1953

Region	1948	1953	Increase
	<i>1,000 hectares</i>	<i>1,000 hectares</i>	<i>Percent</i>
I North central.....	1,216	1,891	56
II Aegean.....	394	439	11
III Marmara.....	373	447	20
IV Mediterranean.....	312	440	41
V Northeast.....	227	300	59
VI Southeast.....	370	701	89
VII Black Sea.....	241	313	30
VIII East central.....	542	612	13
IX South central.....	803	1,201	50
Total <sup>1</sup> .....	4,478	6,404	43

<sup>1</sup>Revised estimates of country totals give 4,538,000 hectares for 1948 and 6,410,000 hectares for 1953. Revised estimates are not available by region.

Official statistics show that between 1953 and 1956 the area sown in grain increased 1.3 million hectares, of which 900,000 was in wheat. However, several agricultural technicians in Turkey tend to doubt that substantial expansion of area has taken place since 1953, and there is some evidence to support such an opinion.

True, there have been new areas put into grain production since 1953, but probably not more than would offset the area going out of production. This is probably the situation which will exist for the next several years. About 6.5 million hectares will be sown to wheat and 2.5 million to barley.

The factors supporting this outlook are these:

(1) Mechanization has not increased; in fact, because of maintenance difficulties the number of tractors available for use has probably declined.

(2) The greater part of the land adapted to grain was already in production by 1953. Large areas which were submarginal for grain were also plowed up; and there is evidence that some of this has deteriorated, owing to wind and water erosion, and has been abandoned. In 1956, for example, an estimated 5,000 hectares of the wheat crop on state farms was lost because of wind erosion.

(3) The Central Plateau is semiarid, and there is a great variation within this region. Some of the expanded wheat acreage has been in areas with annual rainfall that is submarginal for wheat production, and after 4 years of low precipitation some of this land is being abandoned.

(4) Livestock products were the traditional cash products of the Anatolian farmer. There is a recognition that this enterprise has been neglected and both the farmer (especially since wheat has failed him) and the Government would like to improve livestock production. There is pressure from the villagers (most of whom did not share in the benefits from this increased wheat production) to restore the communal pastures.

(5) As interest grows in improved livestock feeding, the demand for feed grains will increase at the expense of bread grains. Also, barley is a "surer" crop in years of low rainfall and on land which is alkali or saline.

It is true that, in the present rotation system, the area in fallow is greater than the total acreage in wheat. The Turkish system of fallow (letting the land lie idle) is not very effective in conserving moisture<sup>11</sup> but is necessary to increase the availability of plant nutrients. Through the use of fertilizer more of this vast acreage could be made available for cropping each year. However, a new rotation should and probably will include a forage crop, so will not likely result in a great increase in grain acreage. Furthermore, this development will probably not be in the near future. Also, fertilizer is not very effective in a dry year, thus even when farmers accept the value of this practice, they are taking a chance of a large expense without compensating returns.

Production and yields. --The increase in grain acreage was accompanied by excellent weather, so yields were high. As a result, reported production of wheat increased 106 percent from 1950 to 1953, and barley 78 percent.

There is some question that production actually increased that much or that present production is as high as estimated, relative to 1946-50 levels. Undoubtedly, production has increased, but an analysis of production, consumption, and trade fails to account for several million tons of wheat over the past 6 years.

This discrepancy may be shown in three different ways:

(1) A balance sheet may be constructed for the supply and distribution of wheat in Turkey. Total supply includes Toprak beginning stocks, production, and imports. From this are subtracted exports, allowance for seed and waste, and Toprak ending stocks. The remainder is assumed to be available for food consumption.<sup>12</sup> Average per capita consumption for the 5-year period, 1946-50, was 139 kilograms, whereas the average during the 6 years, 1951-56, was 209 kilograms, an increase of 50 percent.

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<sup>11</sup> It is estimated that only 1 inch is stored, owing to evaporation and transpiration (fallow is not kept clean) during the dry season immediately preceding sowing.

<sup>12</sup> There is no way to estimate on-the-farm stocks, so changes in the level of these stocks account for some of the variation in per capita consumption; for example, 193 kilograms in 1948, a year of good harvests, and 102 kilograms in 1949, a drought year. However, over a period of years these changes should balance.

TABLE 12.--Wheat: Supply and distribution, 1946-56

Year beginning July 1	Supply			Distribution			Available for food		Population
	Pro- duction	Toprak beginning stocks	Imports	Total Supply	Exports	Toprak ending stocks	Domestic dis- appearance	Seed and waste <sup>1</sup>	
	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.
1946.....	3,648	120	0	3,768	196	62	3,510	850	2,660
1947.....	3,246	62	0	3,308	2	18	3,288	888	2,400
1948.....	4,867	18	9	4,894	0	147	4,747	883	3,864
1949.....	2,517	147	336	3,000	0	60	2,940	842	2,098
1950.....	3,872	60	49	3,981	0	90	3,891	960	2,931
1951.....	5,600	90	106	5,796	223	303	5,270	1,152	4,118
1952.....	6,447	303	3	6,753	593	559	5,600	1,317	4,283
1953.....	8,000	559	0	8,559	847	803	6,909	1,500	5,409
1954.....	4,900	803	190	5,893	444	121	5,328	1,370	3,958
1955.....	6,900	121	316	7,337	256	52	7,029	1,518	5,511
1956.....	6,400	52	674	7,126	0	55	7,071	1,456	5,615
									139
									122
									193
									102
									140
									192
									195
									240
									171
									229
									226

<sup>1</sup>Seed--160 kilograms per hectare for following years acreage: Waste--5 percent of production (in addition to waste at harvest, which is not included in production figure). Wheat is usually not fed to livestock. Mixed grains--reported separately--contain wheat and are used for feed.

<sup>2</sup>Includes changes in stocks on the farm, which would be important from year to year but should more or less balance over a period of years.

For stocks, production, imports, and exports, statistics from official Turkish publications.

(2) Another approach to an analysis of grain production and use is to determine the on-the-farm use--food, seed, and waste. This figure is subtracted from production, and the remainder is assumed to be available for sale. This is compared to Toprak purchases.<sup>13</sup> The total difference in 1946-50 was 231,000 tons, while in 1951-56 the difference amounted to 8.3 million tons.

TABLE 13.--Wheat: Supplies available for sale and Toprak purchases, 1946-56

Year beginning July 1	Production	Used on farm <sup>1</sup>	Available for sale	Toprak purchases	Difference
	1,000 m. t.	1,000 m. t.	1,000 m. t.	1,000 m. t.	1,000 m. t.
1946.....	3,648	3,066	582	638	-56
1947.....	3,246	3,177	69	287	-218
1948.....	4,867	3,136	1,731	567	1,164
1949.....	2,517	3,278	-761	47	-808
1950.....	3,872	3,392	480	331	149
1946-50.....					231
1951.....	5,600	3,623	1,977	710	1,267
1952.....	6,447	3,871	2,576	1,230	1,346
1953.....	8,000	4,023	3,977	1,752	2,225
1954.....	4,900	4,146	754	432	322
1955.....	6,900	4,379	2,521	886	1,635
1956.....	6,400	4,527	1,873	383	1,490
1951-56.....					8,285

<sup>1</sup>Food, seed and waste: Food--150 kilograms per capita of rural population for 1946-50, increasing 2 percent per year 1951-56 (rural population 78 percent of total); seed--160 kilograms per hectare for following year; waste--5 percent of amount used on farm..

(3) An investigation of official average national yields also indicates that wheat production since 1950 has been overestimated. About 80,000 hectares of wheat are sown annually on the several large state farms owned by the Government. Cultural practices on these farms are much better than is general in Turkey. Most operations are mechanized and done at the proper time. Improved seed, fertilizer, and herbicidal sprays are also used. Between 1943-50, average wheat yields on the state farms were 28 percent above the national average. Between 1951-56, however, the average on state farms was only 1 percent above the national yield.

It has been claimed that estimates of production and rural consumption were too low before 1950 and that the higher level of estimates is more nearly correct. However, the summary of the National Agricultural Census, which was taken in November 1950, gives the area of wheat in 1950 as 3,880,111 hectares, whereas the Central Statistical Office published it as 4,477,191 hectares. Wheat production is 2,987,290 metric tons in the census summary and 3,871,926

<sup>13</sup> An indeterminant amount of wheat moves directly from farmer to miller or merchant but this is small compared to Toprak purchases.



TABLE 14.--Wheat: Yield per hectare, national average and on state farms, 1943-56

Year	National average	14 state farms	State farms percent of national
	1,000 m.t.	1,000 m.t.	1,000 m.t.
1943.....	1,002	1,398	140
1944.....	841	916	109
1945.....	585	541	92
1946.....	952	1,583	166
1947.....	777	1,089	140
1948.....	1,086	1,452	134
1949.....	628	666	106
1950.....	864	980	113
1943-50 Ave.....	841	1,078	128
1951.....	1,169	1,075	92
1952.....	1,194	1,222	102
1953.....	1,248	1,435	115
1954.....	765	835	109
1955.....	977	983	101
1956.....	872	760	87
1951-56 Ave.....	1,037	1,051	101

Data on State farms from "An Analysis of Wheat Production in Turkey," by Wilbur Harlan, ICA Airgram: TOICA A-430, Nov. 16, 1956.

tons estimated by the Central Statistical Office.

If reported national total production were reduced 20 per cent between 1951 and 1956,<sup>14</sup> it would bring Turkey's wheat supply and distribution more in balance. Average amount available for consumption would be reduced from 209 kilograms per capita to 153 kilograms, which is 14 kilograms above the previous period. Total wheat available for purchase would be reduced 7.6 million tons, about 700,000 tons above Toprak purchases. The state farm average yield is 22 percent above the revised national average yield of 853 kilograms.

Production in the next 5 years. --In projecting Turkey's wheat production into the future, consideration must be taken of the many factors which will affect production. The most important of these is the relation between rainfall and yield.

Most of the wheat is produced in the central Anatolian Plateau, where the average annual rainfall is near the lower limit for successful wheat growth; however, most of the precipitation comes during the growing season. There is a variation in annual rainfall of almost 60 percent from one Province to another within this area. There is also considerable variation from year to year which, of course, causes a large difference in production. The average yields for the 14 state farms show a year-to-year variation of almost 250 percent.

<sup>14</sup> Overestimation of production undoubtedly varies from year to year and probably was much greater for the last three years of the period than for the first three years; however, to adjust each year differently would assume an unwarranted degree of precision.

Of even more importance is the seasonal distribution of rainfall. Rain in April and May is absolutely necessary to produce wheat. Rain in March and the early part of June will greatly improve the crop. A bumper crop will not be obtained without rain in the fall to germinate the seed. If ground moisture is high and the plant well rooted at the beginning of spring, a fair crop can be raised with less spring rain.

An analysis of the relationship between amount and distribution of rainfall and crop yields in different areas of Turkey would greatly facilitate estimating the wheat crop at different periods of the year. Such an analysis was made for the Ankara Experimental Farm as an example of the type of information which would be useful.<sup>15</sup> Climatic data are available for most of the country, and historical yield data from the state farms should be sufficiently accurate to justify the extension of this type of analysis to the major wheat areas.

Because of the high dependence on a variable rainfall, it is impossible to forecast wheat yields for any one year in the future. However, for a "normal" year, there is little reason to expect the average wheat yields for the country to exceed the average level between 1936 and 1950. There has been some improvement of seed and some control of disease and pests. However, on most of the wheat acreage cultural practices have not changed. There has been a loss of natural fertility on new lands and erosion has reduced yields in some areas. And there has been a shift of irrigated land in the plateau from wheat to sugar beets, potatoes, and other crops. This not only decreases average yields but also increases the variation in yields due to differences in rainfall. With the increase in other crops in the coastal regions there has been a decrease in fallowing for grain crops. Without fertilization, this change would tend to lower yields of wheat.

The average yield between 1936 and 1950 was 920 kilograms per hectare. This is higher than the yields in other Middle East and North African countries with similar climate; they average between 500 and 700 kilograms. After production was deflated 20 percent between 1951-56 the average yield for the first 3 years was 956 kilos and for the last 3 years 750 kilograms.

Assuming an average area in wheat of 6.5 million hectares and an average yield of 920 kilos per hectare the projected annual wheat production over the next 5 years would be almost 6 million metric tons.<sup>16</sup>

The average yield of barley between 1936 and 1950 was 981 kilograms per hectare. With a projected area in barley of 2.5 million hectares, the resulting average annual barley production would be 2,450,000 metric tons.

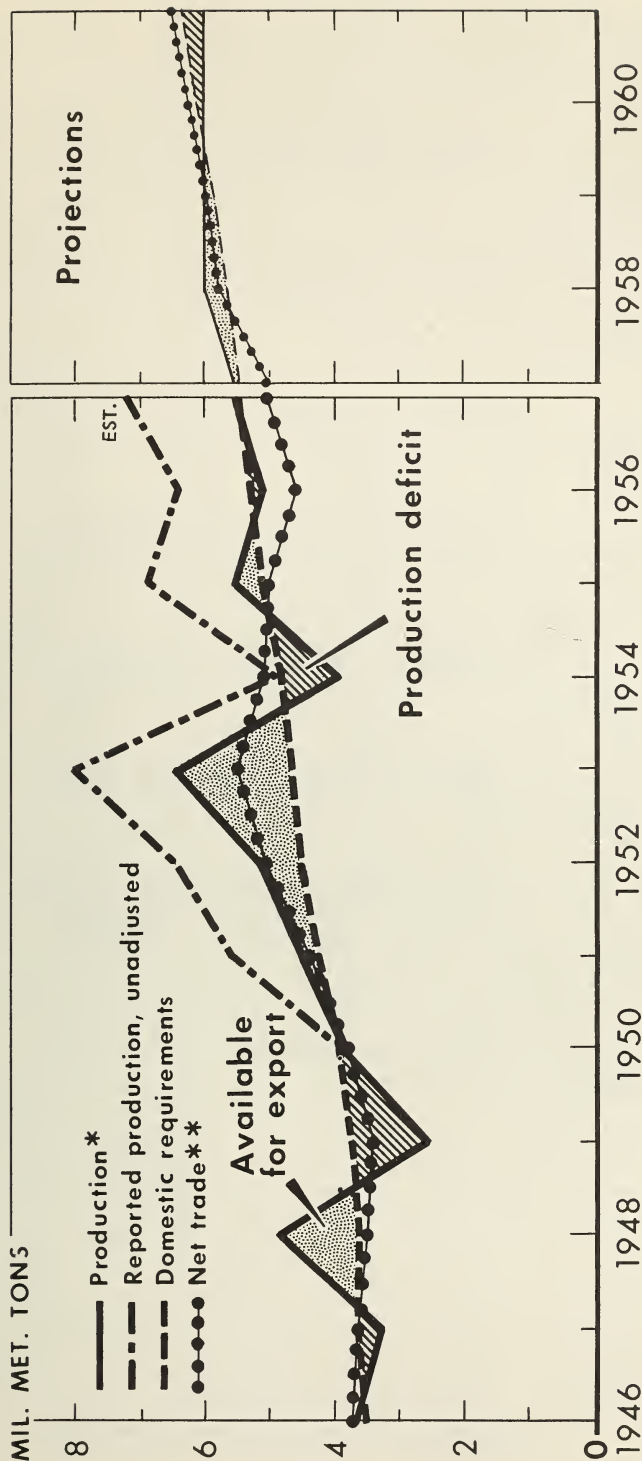
These 5-year projections are made with the assumption that climatic conditions in Turkey will fluctuate as they have in the past and that technological improvement will not proceed

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<sup>15</sup> See Appendix II for this analysis.

<sup>16</sup> See Appendix III for an estimate of wheat production for 1957.

# **TURKEY: Wheat production, requirements, and net trade, 1946-57 and projections 1958-61**



\* 1951-57, ADJUSTED      \*\* MEASURED FROM DOMESTIC REQUIREMENT LINE

TABLE 15.--Wheat: Requirements for domestic use, 1946-61

Year beginning July 1	Popula- tion <sup>1</sup>	Requirements				Produc- tion <sup>4</sup>	Net trade	Change in Toprak stocks beg.-end	Excess of supply over use
		Food, rural <sup>2</sup>	Food, urban <sup>2</sup>	Seed and waste <sup>3</sup>	Total				
	Million	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.
1946.....	19.2	2,246	422	843	3,511	3,648	-196	58	---
1947.....	19.6	2,293	431	907	3,631	3,246	-2	44	---
1948.....	20.0	2,340	440	820	3,600	4,867	9	-129	---
1949.....	20.5	2,399	451	904	3,754	2,517	336	87	---
1950.....	21.0	2,457	462	960	3,879	3,872	49	-30	---
Total 1946-50.....					18,375	18,150	196	30	1
1951.....	21.5	2,570	579	1,083	4,232	4,480	-117	-213	---
1952.....	22.0	2,683	599	1,220	4,502	5,158	-590	-256	---
1953.....	22.5	2,798	619	1,257	4,674	6,400	-847	-244	---
1954.....	23.0	2,899	650	1,281	4,830	3,920	-254	682	---
1955.....	24.1	3,120	683	1,294	5,097	5,520	60	69	---
1956.....	24.8	3,261	704	1,303	5,268	5,120	684	2	---
Total 1951-56.....					28,603	30,598	-1,064	40	971
1957.....	25.5	3,422	738	1,313	5,473	---	---	---	---
1958.....	26.2	3,590	772	1,324	5,686	---	---	---	---
1959.....	26.9	3,759	796	1,334	5,889	(6,000)	(-120)	(0)	---
1960.....	27.6	3,934	832	1,345	6,111	---	---	---	---
1961.....	28.3	4,110	856	1,356	6,322	---	---	---	---
Total 1957-61.....					29,481	30,000	-600	---	-81

<sup>1</sup>Population growth 1957-61 estimated at 2.8 percent, which is 1951-56 average.<sup>2</sup>Population estimated as 78 percent rural and 22 percent urban. Per capita consumption; 150 kilograms rural, 100 kilograms urban (1946-50 average) increasing at 2 percent per year after 1950 (100,000 tons added to urban after 1950 for extra rural consumption). <sup>3</sup>Seed estimated at 160 kilograms per hectare seeded succeeding year; reported area 1946-54, estimated area of 6.5 hectares 1955-61. Waste; 5 percent of total requirement. <sup>4</sup>Reported production 1946-50, adjusted production 1951-56 (reduced 20 percent from reported), estimated average 1957-61 (6.5 million hectares at average yield of 920 kilos).



at a much greater rate than at present. It is possible, however, that Turkey could have 5 years of excellent weather or 5 years of drought, which would completely change the picture. Unforeseen events which may accelerate the rate of technological change would also have an effect on yields.

Wheat consumption. --Bread is the main food of Turkey. Of the daily average consumption per capita, estimated at 2,700 calories, about 70 percent is supplied by grains (48 percent wheat and 11 percent corn). Most estimates of consumption in Turkey are based upon a residual distribution. This results in a great year-to-year variation, which undoubtedly does not reflect the change in actual consumption. In the 12-year period 1942-53, the official balance sheets show a range from 91 kilograms of wheat per capita (1942) to 192 kilograms (1953).

The average per capita consumption from 1946 to 1950 was approximately 140 kilograms. This figure has been used in this report as a basis for calculating consumption requirements. There is some evidence to indicate that the rate of consumption is 50 percent higher in rural areas than in the city. The population is estimated to be 78 percent rural, so per capita consumption was estimated to be 150 kilograms in rural areas and 100 kilograms for urban population.

The trend of wheat consumption in Turkey is upward because of the following factors: (1) Population is increasing at an annual rate of 2.8 percent. (2) The level of living is improving. This will eventually mean an improved diet and replacement of some of the grain with other foods. However, for people who still do not have all they want to eat there will be an increase in consumption of the basic food items for some years. (3) With larger supplies, increased commercialization, and improved standards of living, the quality of bread consumed by the rural population is improving. Rural bread is commonly made from whole wheat and contains some rye, barley, and spelt. Coarse grains are being eliminated, and in some rural areas considerable wheat flour is being purchased. Of the 197 flour mills in Turkey, 19 have been built between 1953 and 1955, and milling capacity has increased 16 percent. (4) The build up of a large military force in Turkey since the Korean War has required additional wheat supplies. (5) There has been a shift in consumption patterns (encouraged by the Government) in the Black Sea region, replacing corn with wheat.

No evaluation is available, however, of precisely the amount these factors are increasing per capita consumption. In this report, therefore, the averages obtained for the period 1946-50 have been increased 2 percent each year from 1951 in estimating domestic consumption in the past 6 years and in projecting domestic requirements for the next 5 years. An additional 100,000 metric tons has been added annually since 1951 for increased military needs. Thus, higher per capita consumption, plus population increase, would bring domestic requirements up to 6.3 million in 1961.

Estimated urban requirements may be compared to actual Toprak domestic sales over the last 5 years:

	1956-57	1955-56	1954-55	1953-54	1952-53
	1,000 m. t.	1,000 m. t.	1,000 m. t.	1,000 m. t.	1,000 m. t.
Estimated urban requirements.....	739	717	683	650	629
Toprak domestic sales....	1,149	811	822	666	404

The increase in Toprak sales compared to urban requirements in recent years is due largely to distribution of seed to farmers (estimated at 70,000 metric tons for 1957-58), increased use of milled flour in small populated centers, use of wheat in the Black Sea area, and, in 1956-57, distribution to rural areas which suffered drought. There also has been a shift of population to the urban centers due to increased industrialization. Therefore, the distribution between rural and urban population of 78 and 22 percent, determined from the 1950 census, has probably changed in favor of urban areas.

Barley consumption. --For generations, the livestock of Turkey have been poorly fed, receiving little concentrates. Recently the Government and private agencies have shown considerable interest in improving livestock feeding. A Government corporation has been formed to develop a livestock feed industry. Domestic consumption of barley will increase as this industry progresses. All of Turkey's production of feed grains could be easily utilized in its domestic livestock industries.

Exports. --Between 1946 and 1950 (crop years) Turkey exported 198,000 tons of wheat, of which about 110,000 tons were durum; and imported 394,000 tons of soft wheat, giving a net import of 306,000 tons of soft wheat. Between 1951 and 1956, exports were 2,363,000 tons, of which 727,000 tons were durum. Imports were 1,299,000 tons of soft wheat, giving a net export of 337,000 tons of soft wheat. Thus, over the past 11 years Turkey has had a net export of only 31,000 tons of soft wheat.

With a projected average annual wheat production during the next 5 years of 6 million tons, and domestic requirements increasing from 5.5 million to 6.3 million tons, the net balance would be only about 500,000 tons. If Turkey exports 120,000 tons of durum each year (about the 1951-56 average), it will mean that production and domestic requirements of soft wheat are about in balance and there will not be a net exportable surplus of soft wheat.

In view of this net balance in production and domestic needs, and the extreme year-to-year variation in production, the logical supply program for Turkey would be to build up stocks during years of surplus production for use during years of deficiency. Toprak has constructed storage facilities of about 2 million tons capacity, so is in excellent position to carry out such a program.

Because of the acute shortage of foreign exchange, there is likely to be a strong urge for the Government to export whatever wheat surplus is available in any good crop year, even though comparable imports will have to be made in subsequent years. Such a policy would not seem to be economical in view of the transportation and other costs associated with wheat imports. If this practice is followed, however, Turkey will export soft wheat following good years and import it after poor years. Since durum is in short supply on the world market and Turkey's surplus is more valuable exported than used domestically, the Government no doubt will export durum each year.

Turkey has been able to sell surplus feed grain in the European market and has been a direct competitor of the United States in that area. It will probably have an exportable surplus of 100,000 to 150,000 tons of barley in good seasons for a few years, depending on how fast the mixed feed industry progresses.

### Cotton<sup>17</sup>

Production. --Cotton is grown principally in the Ismir-Aegean and the Adana regions, although there are four other smaller producing areas--Sakarya, Malatya, Igridir, and Antalya. Only two varieties of cotton are permitted by law--Acala, introduced from the U. S. in 1933; and Yerli, meaning "native," a coarse, short staple, Indian variety. Only Acala, is grown in the Ismir-Aegean area and it is Turkey's best quality cotton. Both varieties are grown in Adana.

Area in cotton was rather stable through the 1930's and the 1940's, but, beginning in 1950, it expanded tremendously, reaching a peak of 675,000 hectares in 1952. Since then, it has leveled off at about 600,000 hectares. Estimated area for the 1957 crop is 587,000 hectares.

Much of this expansion was in the Adana area; two Provinces there increased from 184,000 hectares in 1949 to 317,000 in 1951. Three Provinces in the Ismir-Aegean region increased from 85,000 to 131,000 hectares during this period. In the Adana area much of the land is in large farms, is better adapted to mechanization, and previously was extensively cultivated (partly because of the incidence of malaria which has now been brought under control).

At the same time, production increased and then--after 1952--decreased 15 to 20 percent. The Central Statistical Office estimated cotton production for 1956 at 165,000 tons; however, the Bureau of Standardization reports that 146,000 tons were produced that year. This latter figure is probably more nearly correct.

Cotton yields are relatively low, especially in the Adana area. Production for 1957 is estimated at only 125,000 tons. Farmers report a degeneration of seed, which has not been

<sup>17</sup> A survey of the competitive aspects of Turkish cotton was made by W. E. Christian of FAS in 1956. This is reported by F. D. Barlow in FAS M-18, 1957.



TABLE 16.--Cotton: Area, production, and exports, average 1934-38 and 1945-49, annual 1950-57

Year beginning Aug. 1	Area	Production	Crop year exports
Average:	1,000 hectares	1,000 metric tons	1,000 metric tons
1934-38.....	251	52	18
1945-49.....	261	58	16
Annual:			
1950.....	448	118	76
1951.....	642	150	57
1952.....	675	165	94
1953.....	605	139	82
1954.....	582	142	51
1955.....	615	130	32
1956.....	620	146	51
1957 <sup>1</sup> .....	587	125	--

<sup>1</sup>Estimated.

Statistics for 1955 and 1956 are based on reports of Turkish Bureau of Standardization, which controls all cotton ginning. These differ from the figures of the Central Statistical Office. Statistics for previous years are not in variance.

replaced since it was introduced in 1955. Also, continuous cropping in some areas has lowered yields. Insect pests are serious, especially the pink bollworm in the Adana area. On irrigated land, soil salinity has become a problem. Fertilization has not become a general practice as yet. There are great possibilities for increasing yields in the future through fertilization, better seed, and improved cultural practices but it is doubtful that much progress will be made within the next 5 years.

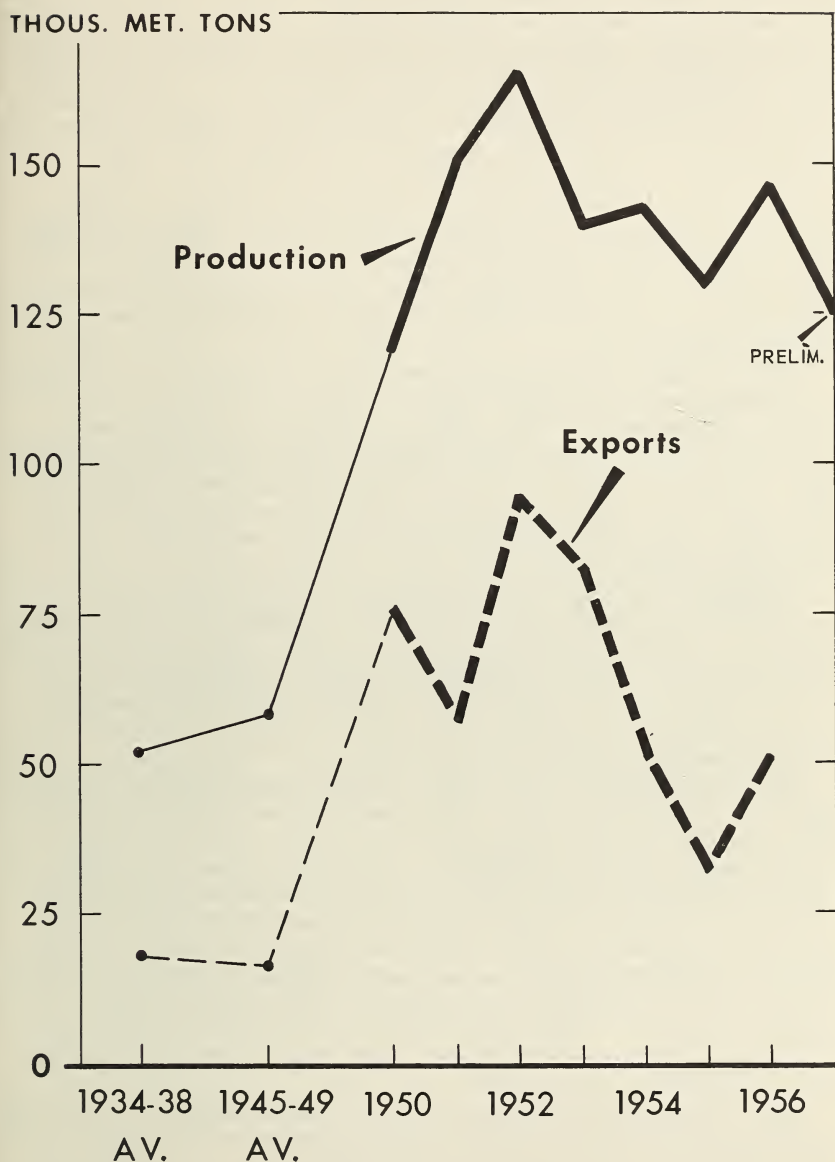
Because of low yields, high labor costs, and reduced world cotton prices, cotton is having difficulty in competing with some other crops (even with support prices), particularly in the Adana area. Alternative crops in the Ismir-Aegean area are tobacco, figs, grapes, olives, and wheat. The present export situation limits the expansion of the first four, although returns per hectare are higher than cotton. Wheat returns per hectare are less than cotton and in certain areas, being a winter crop, may be damaged by spring floods. Area in cotton will probably remain at the present level in the region.

In the Adana area the Seyhan Dam was to bring 150,000 additional hectares under irrigation and increase cotton production about 50,000 tons. However, it is now recognized that no new area can be irrigated without an extensive drainage system. There has been a shift of area to peanuts and with the repeal last year of the prohibition for malaria control against rice production, considerable area is now being sown to rice.

An optimistic estimate for annual cotton production during the next 5 years would place area at 620,000 hectares; the 20-year average yield of 225 kilograms per hectare would



# TURKEY: Cotton production and exports, averages 1934-38 and 1945-49, annual 1950-57



CROP YEAR BEGINNING AUG. 1

give a total annual production of 140,000 metric tons (645,000 bales).

Consumption. --Modern textile factories were first established in Turkey in 1925. With the founding of the Sumerbank in 1933, state-owned mills increased rapidly and the majority of the 200,000 spindles in 1938 were state-operated. In 1949, however, of the 241,666 spindles in operation, more than half were privately owned.

By 1957 the textile industry had almost tripled the 1949 level, again largely in the private sector. Total equipment amounts to 716,370 spindles and 14,615 looms. In the past year, 457 million meters of cloth and 83,716 tons of yarn were produced. Present domestic utilization of cotton is estimated at 100,000 to 110,000 metric tons. Recently, several plants for printing and dyeing have been completed and this industry is also expanding rapidly. Under construction are 369,888 spindles and 9,220 looms that will be in operation by the end of 1958. The Chamber of Industries passed a decree in 1957 that no more construction permits would be granted.

If the annual utilization of cotton per spindle in Turkey is estimated at three-fourths bale, capacity operation of domestic mills will require 790,000 bales (172,000 metric tons) by 1959. This is 145,000 bales (32,000 metric tons) more than the projected production. Either the mills will not operate at capacity, cotton production will have to be stepped up by increased prices, or some cotton will need to be imported.

Exports. --In 1938, cotton exports were 25,888 metric tons. This decreased to 15,951 tons in 1948. With expanded production and high world prices, exports increased almost five times by 1950 and reached a peak of 100,625 tons by 1953. Since then, production has fallen off and domestic consumption has greatly increased, reducing exports to almost one-third of the 1953 level.

The Government has made a determined effort to maintain some cotton exports, especially to dollar areas and EPU countries, to obtain needed foreign exchange. There is a 35-percent export subsidy on cotton to dollar and EPU areas. However, this is not sufficient to make up the difference between domestic prices and world prices, so private merchants cannot afford to export. The only foreign trade is being done by the two semiofficial Unions of Cotton Cooperatives--Tariş and Çukoverlik. The Government makes the export contract and the unions carry out the shipment. Losses over the 35-percent premium are also reimbursed by the Government.

The continued expansion of the textile industry is not being accompanied by increased cotton production. Therefore, it is unlikely that Turkey will continue to be a cotton exporter, except for very low grade fiber. A large part of the present exports is shipped to France for mattress stuffing. Turkey does not now have an exportable surplus of fine-quality

cotton. In April 1957 when the Government announced an agreement to sell 6,000 tons to Communist countries, domestic prices jumped 10 percent in a day. This occurred again in June.

If there were not such a shortage of foreign exchange, Turkey could become a net cotton importer. If foreign markets could be obtained for Turkey's textiles, it may become profitable to import some fine-quality cotton. This shift from a raw material exporter to a textile manufacturer, and even exporter, could be a net gain for Turkey. Reduction in value of imports of textile goods from 1953 to 1956 has partly offset the loss in value of exports of cotton.

### **Effect on U. S. Farm Exports**

The tremendous agricultural expansion in Turkey between 1950 and 1953 led to the conviction that this country had become and would continue to be a large exporter of wheat, barley, and cotton--in addition to its traditional exports of oriental tobacco, dried fruits, nuts, and some animal products. Since that time the United States has considered Turkey an important competitor in the world grain and cotton markets. At the same time it believed there was little opportunity to develop significant markets for United States farm exports in Turkey.

The picture has changed considerably since then. Evidence presented in this report indicates that Turkey will not be a net exporter of soft wheat in the foreseeable future. There will be years in which it will produce a surplus of wheat; there will be other years in which it will have shortages. A reserve storage program would smooth out some of this variation. The United States will probably be the principal supplier for the wheat Turkey imports; however, this will probably be on an emergency relief basis and not dollar sales. Any Turkish soft wheat exports should find a ready market in Western Europe--in payment for goods obtained there--and therefore will compete with United States wheat.

Until the livestock feeding program really gets under way, Turkey will usually have an exportable surplus of 100,000 to 150,000 tons of barley. This will be marketed in Europe in competition with United States feed grains.

Within a few years, Turkey will likely be entirely out of the world cotton market. The small amount now being shipped is of a quality inferior to United States exports.

Exports of United States farm products to Turkey have increased sevenfold since 1954. Most of this has been grains, but dairy products and fats and oils are also important. There are possibilities of expanding the market for United States agricultural products in Turkey, which market will increase as levels of living improve. Almost all the United States agricultural exports are now under programs, such as PL 480, and Turkey will probably have a foreign currency shortage for some time. However, this country now sells

the United States, for dollars, exports amounting to \$60 million to \$75 million, of which almost three-fourths are agricultural products. Turkey has dollars to buy the United States goods for which there is the greatest demand. United States beef tallow is now established in Turkey's soap industry, releasing for export higher-value olive oil. This United States product will likely be purchased for dollars when not available on PL 480. There are possibilities for developing markets for other United States agricultural products, particularly quality dairy products and mixed livestock feeds.



# APPENDIX I

Exports: Quantity of principal agricultural commodities, average 1946-50, annual 1938 and 1951-56

Commodity	1938	Average 1946-50	1951	1952	1953	1954	1955	1956
Tobacco.....	1,000 m.t. 43.5	1,000 m.t. 50.5	1,000 m.t. 57.9	1,000 m.t. 57.1	1,000 m.t. 71.7	1,000 m.t. 64.4	1,000 m.t. 60.0	1,000 m.t. 59.5
Cotton.....	25.9	30.0	55.9	69.9	100.6	60.2	52.2	34.6
Mohair.....	2.9	2.2	2.1	3.2	4.5	3.3	3.9	3.8
Opium.....	.1	.2	.2	.2	.1	.2	.3	.2
Wool.....	5.9	1.6	3.5	.5	.4	.6	1.1	( <sup>1</sup> )
Durum wheat.....	--	21.9	20.3	206.3	240.4	177.1	83.8	136.7
Soft wheat.....	101.5	19.0	0	242.5	360.1	776.4	75.1	38.8
Barley.....	123.9	35.1	88.9	147.5	159.9	50.0	90.4	163.1
Rice.....	0	1.6	1.0	0	9.7	8.7	6.3	0
Filberts.....	24.9	28.8	22.9	27.1	29.9	33.7	45.3	25.4
Raisins.....	77.1	55.2	35.0	44.2	32.6	52.8	33.2	48.4
Dried figs.....	41.3	21.0	18.2	19.5	14.1	21.2	16.9	15.7
Citrus fruits.....	4.1	.1	( <sup>1</sup> )	8.9	9.7	4.7	8.8	8.5
Walnuts.....	9.6	3.5	3.2	1.2	.8	2.0	2.0	.1
Pistachios.....	.4	2.3	1.9	.7	.7	0	.4	1.7

<sup>1</sup> Less than 50 tons.

Exports: Value of agricultural and total, average 1946-50, annual 1938 and 1951-56

Commodity	1938	Average 1946-50	1951	1952	1953	1954	1955	1956
	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.
Tobacco.....	14.0	62.8	67.0	62.1	85.2	85.9	89.0	93.2
Cotton.....	3.6	21.8	77.0	69.1	78.6	52.4	45.7	26.3
Mohair.....	1.3	2.9	5.7	5.7	10.2	7.6	8.5	9.5
Opium.....	.3	3.7	3.9	3.2	2.4	2.8	3.8	.1
Wool.....	1.1	1.4	5.9	.4	.4	.8	1.8	( <sup>1</sup> )
Total raw materials.....	22.4	99.7	170.0	145.1	182.6	144.1	154.6	( <sup>2</sup> )
} Durum wheat..... Soft wheat..... Barley..... Rice.....	2.0	3.2	2.4	25.6	25.3	11.9	7.4	13.9
		2.7	0	32.9	33.4	55.6	5.0	3.4
	1.9	3.4	8.0	14.7	12.5	2.4	5.4	9.0
	0	( <sup>1</sup> )	( <sup>1</sup> )	0	2.2	2.1	1.2	0
Total grains.....	5.6	16.4	20.2	88.7	85.9	76.5	23.1	28.2
Filberts.....	4.6	15.0	18.0	18.4	22.3	26.4	44.5	29.6
Raisins.....	4.8	14.2	10.8	11.4	7.8	11.2	8.2	15.4
Dried figs.....	2.0	5.0	3.9	4.2	2.7	4.0	4.1	3.6
Citrus fruits.....	.2	( <sup>1</sup> )	0	1.1	1.4	.8	1.5	2.0
Walnuts.....	.7	1.2	1.2	.5	.3	.9	1.1	( <sup>1</sup> )
Pistachios.....	.1	2.0	2.0	.8	.9	0	.4	1.9
Total fruits, vegetables, and nuts.....	13.4	39.7	39.5	39.0	37.2	46.9	62.8	54.7
Livestock, other livestock products.....	3.7	24.2	21.0	14.7	15.2	11.3	15.2	( <sup>2</sup> )
Pulses and seeds.....	1.7	14.9	16.4	13.3	12.9	3.0	2.9	( <sup>2</sup> )
Total agricultural products.....	46.8	194.9	267.1	300.8	333.8	281.8	258.6	246.3
Other commodities.....	5.0	22.3	47.0	62.1	62.3	53.2	54.8	58.7
Total exports.....	51.8	217.2	314.1	363.0	396.1	335.0	313.4	305.0

<sup>1</sup>Less than \$50,000.<sup>2</sup>Not available.

## II

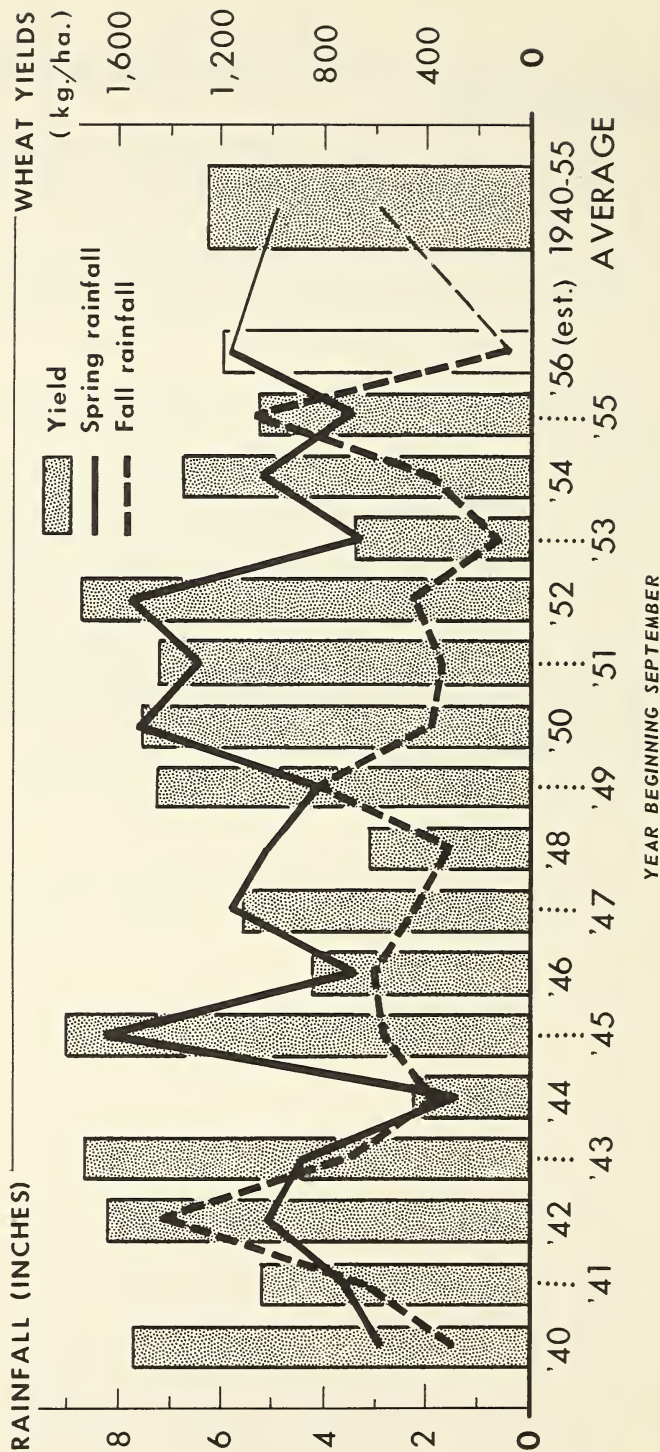
### Analysis of Rainfall and Wheat Yields on the Ankara Experimental Farm

The Ankara Experimental Farm has about 200 hectares in wheat and has maintained production and rainfall records for 16 years. An examination of these data shows that the direction of the variation in wheat yield is almost always the same as the variation in spring rainfall. An exception was 1949 when a severe spring rain was destructive to the crop. Whether the yield exceeds or falls short of the relative level of spring rainfall appears to be related to the level of fall precipitation.

A correlation analysis gives the relation between wheat yield and spring rainfall, as measured by the correlation coefficient, as 0.65. The correlation coefficient for wheat yield and fall rainfall is 0.31. The multiple correlation coefficient, calculated with wheat yields as the dependent variable and spring and fall rainfall as independent variables, is 0.69. This indicates that 48 percent of the variation in wheat yields results from variation in spring and fall rainfall.

In using the regression equation:  $\text{Yield} = 30 + 0.57 (\text{spring rainfall}) + 0.33 (\text{fall rainfall})$  an estimate can be obtained for the 1957 wheat yield on the Ankara Experimental Farm. This is estimated as 1,190 kilos per hectare, which is 95 percent of the average yield.

# **TURKEY: Wheat yields compared with spring and fall rainfall, Ankara Experimental Farm, 1941-56**





### III

#### Estimated Production of Wheat in Turkey in 1957

The official estimate (as of September) of Turkey's 1957 wheat crop was 7.2 million metric tons. This is probably overestimated somewhat more than the usual 20 percent. There has been excellent weather since April 15 but there was little fall moisture. Indications are that the crop may be comparable to 1955, on about 5.5 million tons.

It is likely that farmers will withhold large quantities of the crop to replenish farm stocks, which were depleted over the past few years. On the other hand, the 33-1/3 percent price rise will undoubtedly bring more wheat from the farms than would otherwise be expected.

An estimate of the amount of wheat which may be available for commercial use may be obtained from an analysis of Toprak purchases during the past few years. The percentages of the total annual purchases which had been made by the end of August and September are as follows:

	<u>August</u>	<u>September</u>
	<i>Percent</i>	<i>Percent</i>
1956-57 .....	77	95
1955-56 .....	65	90
1954-55 .....	75	88
1953-54 .....	56	83
1952-53 .....	48	79

In recent years a greater percentage has been purchased early in the season.

If it is assumed that the 593,192 tons which Toprak had purchased by the end of September represented about 90 percent of the wheat that it will be able to obtain from the farmers this season, total purchases will be only about 660,000 tons. Purchases have begun to fall off earlier in 1957-58 than in 1955-56. Toprak must have about 1 million tons of wheat in 1957-58 to supply estimated domestic needs (including urban, military and seed and other rural requirements). Domestic purchases will probably be short about 440,000 tons and wheat will have to be imported. (187,000 tons has been imported this season from last year's agreement.) Additional wheat should probably be imported to build up operational stocks to a safe level.

